

COLUMBIA LIBRARIES OFFSITE
HEALTH SCIENCES RESTRICTED



HR0228823

RECAP

SERIAL

26th

0

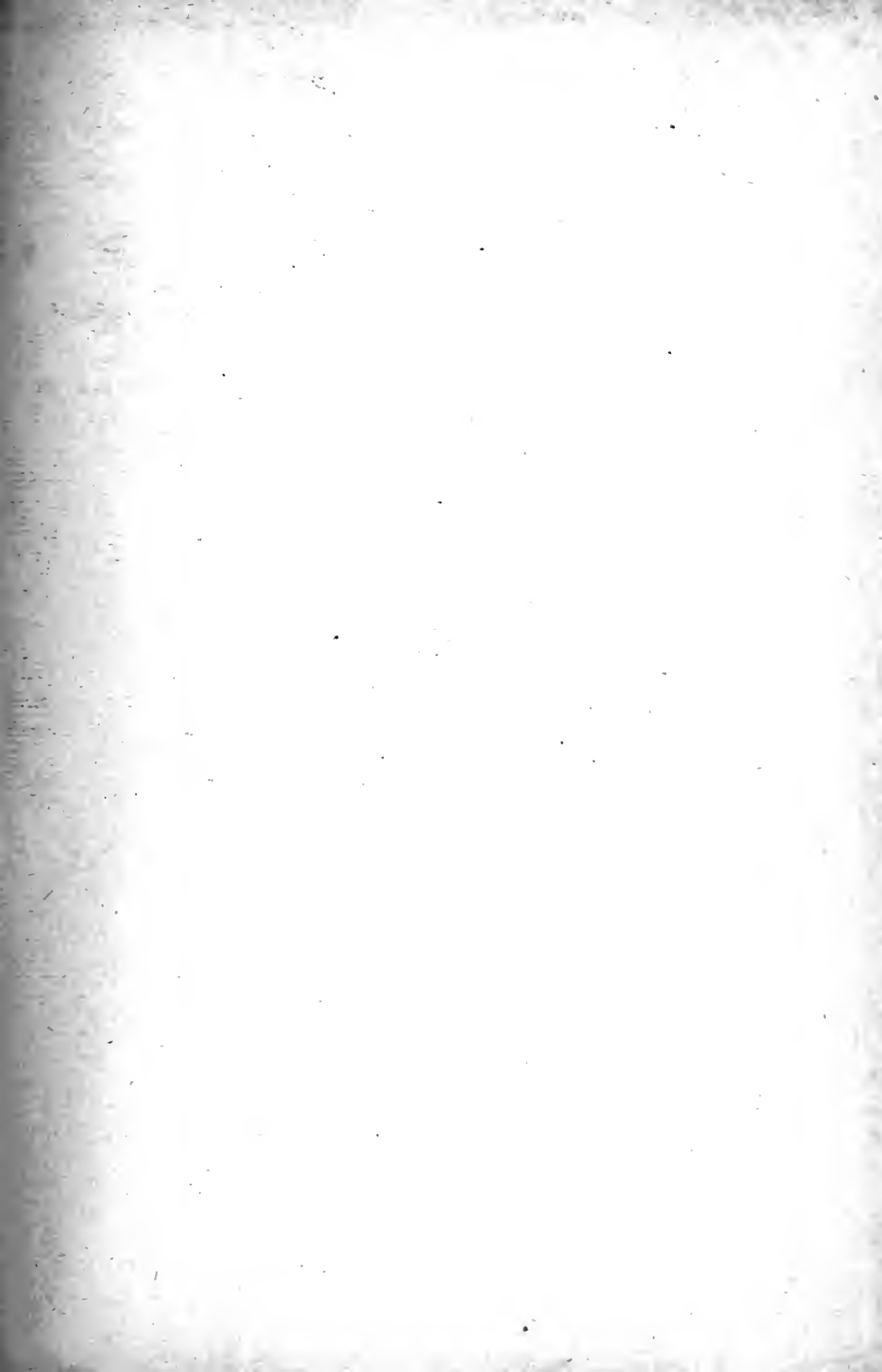
1911

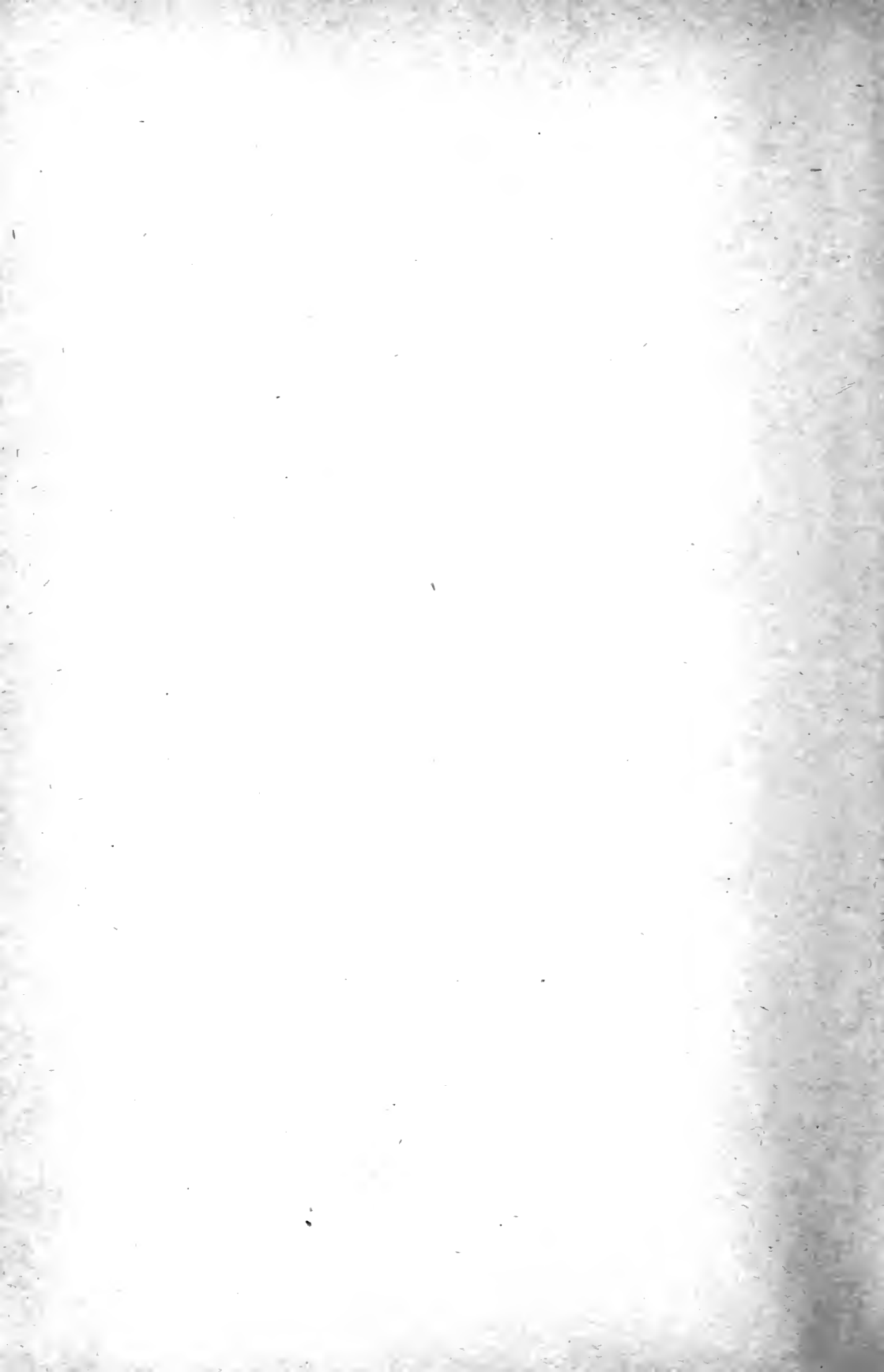
Columbia University
in the City of New York

College of Physicians and Surgeons

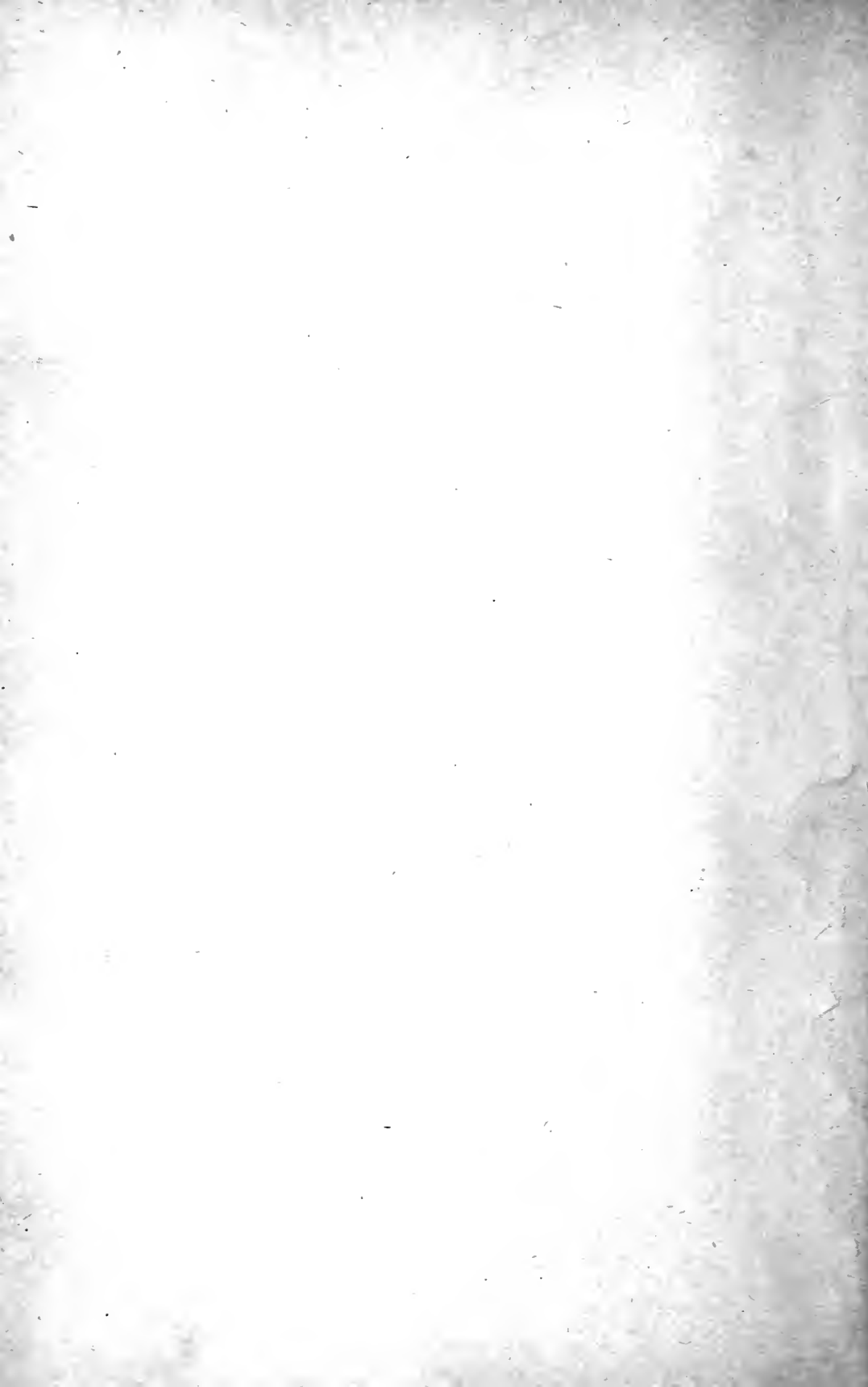


Reference Library





Digitized by the Internet Archive
in 2010 with funding from
Columbia University Libraries



Twenty-Sixth Annual Report

of the

State Board of Health

of the

STATE OF OHIO

for the

YEAR ENDING DECEMBER 31

1911



COLUMBUS, O.:

THE F. J. HEER PRINTING CO.

1912.



LETTER OF TRANSMITTAL.

OHIO STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,

COLUMBUS, OHIO, May 31st, 1912.

To His Excellency, JUDSON HARMON, Governor of Ohio.

SIR:—In accordance with Section 1248 of the General Code, the accompanying report, which is for the calendar year 1911, is herewith submitted for your consideration and for publication.

Respectfully,

JAMES E. BAUMAN,
Acting Secretary.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

WM. T. MILLER, M. D., President, Cleveland.....	December, 1911
FRANK WARNER, M. D., Vice-President, Columbus.....	December, 1912
*OSCAR HASENCAMP, M. D., Toledo.....	December, 1913
JOSIAH HARTZELL, Ph. D., Canton.....	December, 1914
†R. H. GRUBE, M. D., Xenia.....	December, 1915
JOHN W. HILL, C. E., Cincinnati.....	December, 1916
‡H. T. SUTTON, M. D., Zanesville.....	December, 1917
**C. O. PROBST, M. D., Secretary.....	

*February 20th, 1911, appointed to succeed Dr. Wm. Chapman, deceased.

†February 20th, 1911, appointed to succeed Dr. Darwin G. Palmer, deceased.

‡February 20th, 1911, appointed to succeed Dr. J. C. Crossland.

**Resigned September 15th, 1911. James E. Bauman appointed Acting Secretary.

GENERAL REPORT.

This is the twenty-sixth annual report of the State Board of Health, and is for the year ending December 31st, 1911.

PERSONNEL OF THE BOARD.

The personnel of the Board underwent considerable change during the year. February 20th, 1911, the governor appointed Dr. Oscar Hasencamp, of Toledo, to succeed Dr. Wm. C. Chapman, of Toledo, who died May 29th, 1910; Dr. R. H. Grube, of Xenia, to succeed Dr. Darwin G. Palmer, of Geneva, who died August 27th, 1910, and Dr. H. T. Sutton, of Zanesville, to succeed Dr. J. C. Crossland of Zanesville, whose term of office expired December 13th, 1910.

SECRETARYSHIP.

On August 9th, 1911, Dr. C. O. Probst, who had been secretary and executive officer of the Board since July 27th, 1886, tendered his resignation.

Much of the success of the Board in its work in Ohio and its rank in sanitary matters among the boards of health of this country is due to the untiring efforts and personality of Doctor Probst, and it was with regret that health officials and those interested in sanitary matters learned of his intention to sever his connection with the Board.

The resignation of Dr. Probst was effective September 15th, and on that date James E. Bauman, chief clerk to the Board, was appointed as acting secretary.

MONTHLY BULLETIN.

Beginning with January the Board has published a monthly bulletin to succeed the quarterly bulletin which was issued during 1909 and 1910. This publication is entitled the Monthly Bulletin of the Ohio State Board of Health, and eight thousand copies are distributed each month to health officials, superintendents of schools, newspapers and periodicals, and persons interested in sanitary matters.

The publication of a monthly bulletin enables the Board to publish more information of a sanitary character and to come into closer contact with our local health officials.

CONTAGIOUS AND INFECTIOUS DISEASES.

Aside from outbreaks of acute anterior poliomyelitis (infantile paralysis) at Cleveland and Cincinnati, and a few sharp outbreaks of typhoid fever, Ohio has been fortunate in escaping the ravages of the contagious and infectious diseases. An epidemic of scarlet fever of a mild type has prevailed throughout the year and very few communities in the State escaped having one or more cases. The control of the disease was extremely difficult owing to its mildness and the fact that many cases, especially the early ones, were not reported to health officers by physicians or heads of families. At the end of the year the disease was generally prevalent throughout the state.

July 1st, 1911, Dr. Frank G. Boudreau, of Cleveland, was appointed as epidemiologist and he has been of material assistance in the investigation of diseases and in advising health officials as to proper methods of controlling diseases. The reports of investigations by the epidemiologist and a tabulated report of smallpox cases will be found in another part of this report.

Physicians can be of material assistance to health officers by making prompt reports of all reportable diseases. We regret to say that health officers have not had the cooperation of physicians. When we consider that the law makes it the duty of the physician to make these reports and that the diseases that are reportable have been made known, it is difficult to understand why reports are refused or neglected. If boards of health would, in aggravated cases, prosecute physicians for failure to make reports and invoke the penalty provided by law for such offense, much better results would be had.

Many boards of health have also been remiss in their duty to make prompt and regular reports to the State Board. Without these reports the Board cannot know the existence of outbreaks of disease and render to the local authorities the assistance the Board is required to give. May we hope that in the future these conditions will be corrected and that the Board will be enabled to keep in closer touch with local affairs.

The distribution of antitoxin to local boards of health for use where families are indigent has been continued. During the year 7618 packages, representing 22,978,000 units of antitoxin, have been sent to local distributing stations. There seems to be no immediate prospect of the State making provision for furnishing free antitoxin for the prevention and cure of diphtheria.

ENGINEERING DEPARTMENT.

The year 1911 has been an exceedingly busy one for the engineering department. On later pages of this report will be found reports on water supplies and sewerage, and water and sewage purification

works. In addition to the investigations made necessary by this work much time has been spent in the investigation of works under construction, existing water works and sewerage systems, and of many complaints of unsanitary conditions where local health authorities asked for assistance and advice.

Mr. R. Winthrop Pratt who had been Chief Engineer of the Board since 1903 resigned December 1, 1911 and was succeeded by Mr. W. H. Dittoe assistant engineer in the Engineering Department.

WATER AND SEWERAGE.

Plans for new or additional water supplies for the following places have been acted upon by the Board during the year: Albany, Amherst, Andover, Bremen, Fredericksburg, Hiram, Lisbon, Lodi, Lowellville, Malvern, Millersburg, Minster, New London, Oak Harbor, Oxford, Payne, Portsmouth, Sugar Creek, Utica and Washington.

Plans for sewerage for the following places were acted upon: Ada, Andover, Batavia, Bucyrus, Canal Fulton, Canton (District No. 4.) Coshocton, Covington, Croton, Cuyahoga Falls, Defiance, Green County Children's Home near Xenia, Gibsonburg, Hilliards, Linden Heights, Miamisburg, Muskingum County Children's Home at Zanesville, New Bremen, New Philadelphia, Pleasant Hill, Pleasant Ridge, Piqua, Put-in-Bay, Reading, Sandusky (Mill Creek District), Sandusky, Shreve, Toledo (E. T. Collins Sub-division), Washington C. H. and West Lafayette.

WATER AND SEWAGE PURIFICATION.

The Board was called upon to pass upon plans for the purification of water at Bellaire, Lakeside, Lorain, Niles, Port Clinton, Sandusky, Toledo, and Waverly; and for the purification of sewage at Andover, Beachland (near Cleveland), Bryan, Bucyrus, Camp Wise, Canton, Chardon, Kensington Addition (Columbus), Delaware, Green County Children's Home near Xenia, Hudson (Cleveland Boy's Farm), Kennedy Heights, Toledo (Main Sewer Dist. No. 1, Lucas County), New Bremen, Pleasant Ridge, Salem, Shreve, Washington C. H. and Wilmington.

WASTES DISPOSAL.

The investigation of the subject of wastes disposal inaugurated in 1909, was completed early in 1911. To prevent unnecessary delay in bringing the results of the investigation to the attention of those especially interested the report was submitted and published as a supplement to the twenty-fifth annual report of the Board (1910) then in press. Much favorable comment on the report has been received and it is evident that further study of this subject should be made. As the investigation must be extended to embrace the practice in other states it would seem necessary that the investigation be carried on by the Federal Government, presumably by the Department of Agriculture.

BENSE ACT.

The Board was unable to accomplish much in the matter of pollution of streams owing to the fact that the Bense Act, giving authority to the Board to proceed in such matters, has been in court during the entire year. The litigation to test the constitutionality of this act originated in the common pleas court of Darke County. The State was successful in this court, but on appeal to the circuit court the decision of the common pleas court was overruled, and appeal was taken to the supreme court and an early and favorable decision is hoped for.*

OHIO RIVER COMMISSION.

In September Dr. Probst, as secretary of the Ohio River Sanitary Commission, submitted to the governor a report of the proceedings of the commission to that time. Unfortunately no appropriation was made by legislature for publishing the results of the investigation of the Ohio River by the commission. It would be very desirable to have this report published in monograph form so that it would be available to the many cities, towns and persons especially interested in the condition of this river.

LABORATORIES.

A reference to the "Report of the Hygienic Laboratories" will show the large amount of routine work done during the year. Because of the amount of routine work, the small force employed and the cramped quarters, it has not been possible to extend the work. With better quarters and an increased laboratory force it would be possible to do much valuable work that is now impossible.

INSPECTION OF PLUMBING.

In accordance with an act of legislature a state inspector of plumbing was appointed by the Board on February 15th, 1911, Mr. William C. Groeniger, of Dayton, being the appointee. The report of the inspector does not indicate the amount of work accomplished as, of necessity, much time was spent in getting the department on a working basis. Better results, from the standpoint of inspections made, will be secured during the coming year but if the work increases, as is probable, additional inspectors will be needed.

The Ohio Building Code passed by the last General Assembly has, in general, been favorably received. Some changes of a minor character must be made in the Code and other parts not yet completed must be favorably acted upon by the next General Assembly in order to provide the State with a code that will meet all the conditions to be covered.

*In a decision handed down April 2nd, 1912, the Supreme Court upheld the constitutionality of the Bense Act. The decision in full was published in the Monthly Bulletin of the State Board of Health for April, 1912).

CONFERENCES.

Three conferences with local boards of health were held during the year. One at Columbus in January with boards of health of cities and villages of over 3000 population; one in Cleveland in July with township boards of health and villages of less than 3000 in northern Ohio, and one in October in Cincinnati for boards of health of the same class in southern Ohio. These meetings were well attended. Papers were read and the discussions were printed in the monthly bulletin and distributed.

MEETINGS.

During the year the Board has adhered to a policy of holding monthly meetings. By holding such frequent meetings it has been possible to do away with the plan of submitting propositions for a vote by mail. The minutes of the meetings and the monthly reports of the secretary will be found on following pages

MINUTES OF THE SECRETARY

RESUMÉ OF SECRETARY'S REPORTS.

(11)

JANUARY MEETING

1911

A regular meeting of the State Board of Health was held at the office of the Secretary, in Columbus, January 25th, 1911, at 7:45 p. m.

There were present Mr. Hill, Dr. Warner, Dr. Miller and Dr. Crossland. Mr. Hartzell was absent on account of illness.

Upon motion of Dr. Warner the following order of business was adopted:

1. Roll call.
2. Public hearings (To be referred to executive session).
3. Executive session.
 - a. Consideration of matters presented at public hearing.
 - b. Reading of minutes.
 - c. Reports of committees.
 - Finance committee.
 - Executive committee.
 - Engineering committee.
 - Special committees.
 - d. Report of secretary.
 - e. Old business.
 - f. New business.
 - g. Place of meeting.

Adjournment.

Mr. F. H. Eno, consulting engineer for the city of Cambridge, and the city engineer, appeared before the Board in reference to a new water supply for that city. They stated that they now contemplate securing a new supply by putting a dam in Wills Creek and establishing a filtration plant. They asked that they be granted sixty days time in which to formulate and submit definite plans for this improvement.

Mr. Otto Magly, secretary and superintendent of The Lakeside Campmeeting Association, presented plans for a water filtration plant for Lakeside.

On motion of Mr. Hill, these were received and referred to the chief engineer for report.

Mr. Magly also requested that the Lakeside company should not be required to make any change in their sewerage at this time.

Mr. D. J. James, member of council, and Mr. H. M. Paul, clerk, of the city of Ironton, appeared before the Board and stated that it had been through no neglect on the part of the council that there had been a

delay in putting down a test well in compliance with the Board's former action.

Mr. J. C. Martin, manager of The Wilmington Water and Light Company, appeared before the Board in regard to putting down new wells to increase their water supply.

On motion of Mr. Hill this matter was referred to the chief engineer for investigation and report.

The Board then went into executive session.

The question of the water supply for Cambridge was taken up and on motion of Dr. Warner, it was voted to grant the engineer 60 days time in which to prepare and submit plans.

The chief engineer, Mr. Pratt, reported upon the plans submitted for a water purification plant for Lakeside.

It was moved by Mr. Hill and seconded by Dr. Crossland to approve these plans, prepared by the Pittsburg Filter Company, upon the following conditions:

1st. That the clear water basin be enlarged so as to have a capacity of 125,000 gallons;

2nd. That the filter plant be completed and ready for operation before the opening of the season of 1911;

3rd. That full detailed plans be prepared and submitted to the State Board of Health at its meeting on February 23rd, 1911, for approval;

4th. That the said detailed plans provide for readily increasing the capacity of the filter and that such increase be made in the future whenever deemed necessary by the State Board of Health; and,

5th. That the management of the water purification plant be at all times under the direct charge of an experienced and efficient operator, whose appointment shall first be approved by the State Board of Health.

Those voting in the affirmative were Messrs. Miller, Crossland, Warner and Hill.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Crossland that the Board require that the sewage of Lakeside be screened and that the iron outlet pipe be extended at least 1100 feet from the shore line, said pipe to terminate in several outlets; the screening and extension, likewise, to be done before the 1911 season opens, and plans for the screen chamber to be submitted to the Board on February 23rd, 1911.

Those voting in the affirmative were Messrs. Miller, Crossland, Warner and Hill.

In the negative, none.

The question of the complaint against the village of Ada was taken up.

The village of Ada having been notified of the complaint heretofore filed with the Board and of its findings made after investigation thereof,

appeared before the Board and was represented by Mr. T. J. Small, engineer, and Mr. S. P. Axline, solicitor, and an opportunity was given to the said village through and by its officers to be heard regarding said complaint, and discussion by the members of the Board and by the officers representing said village regarding said conditions was then had.

Upon such hearing being given, said officials filed no valid evidence, protest, or remonstrance against the action or findings heretofore made. After such hearing, it was moved by Dr. Miller and seconded by Dr. Crossland, that the report and findings therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon, it was moved by Dr. Miller and seconded by Dr. Crossland, that the improvements and changes recommended in said report be and the same are hereby declared necessary and should be made, and that the village of Ada be required to purify its sewage in a manner satisfactory to the State Board of Health within five months from the date the Board's order is approved by the governor and the attorney general.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon it was moved by Dr. Miller and seconded by Dr. Crossland, that the report and findings of this Board be submitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

The minutes of the meetings held October 19th and 20th, 1910, December 7th and December 28th, 1910, were presented by the Secretary.

On motion of Dr. Miller, seconded by Dr. Crossland, these were approved.

Dr. Warner submitted a report of the Finance Committee, showing expenditures for the past month; and a list of expenditures which it was desired to make.

On motion of Mr. Hill, the report and list of proposed expenditures was approved.

Dr. Warner, as chairman of the Executive Committee, submitted a report on salaries and expenditures for the years 1911 and 1912. He stated that it had been necessary to prepare such a budget for the finance committee of the house of representatives, who had required the same for the partial appropriation bill.

Dr. Warner further stated that Mr. C. E. Shockey had resigned as clerk in the general office and the Executive Committee recommended that Miss Corinne Dwight be returned from the laboratory to the Secretary's office, at a salary of \$60.00 per month; and that the chairman

of the Executive Committee be authorized to employ a stenographer, a messenger and clerk and an epidemiologist.

On motion of Mr. Hill, seconded by Dr. Crossland, it was voted to approve the report and recommendations of the Executive Committee.

Mr. Hill, as Engineering Committee, submitted the following report upon various engineering propositions which had been referred to him since the last meeting of the Board:

"To Hon. State Board of Health, Columbus, O.

GENTLEMEN:—Your Engineering Committee to whom has been referred certain reports on Sanitary Engineering Improvements submitted by the representatives of the respective cities, begs leave to report as follows:

Port Clinton, Water Filters, Pittsburgh Filter Co., Contractors.

It is recommended that the plans submitted by the Pittsburg Filter Company be approved and that the officials of Port Clinton be advised not to enter into a binding contract with the filter company, if they have not already done so, until the Board has had an opportunity to read and consider the guarantee of the filter performance which it is understood forms part of the contract.

Marble Cliff, Filtering Materials, Sewage Filters.

It is recommended that the filtering materials, consisting of boiler cinders coarser than $\frac{1}{8}$ inch for the contact filters and finer than $\frac{1}{8}$ inch for the secondary filters, be approved.

Galion, Filtering Materials, Sewage Filters.

It is recommended that the use of the fine screened cinders from the Steel Works, Cleveland, for contact filters be not approved and that the size of the particles to be used, whether cinders or other materials, should be no smaller than described in the specification, and any departure from specification dimensions should be toward larger rather than smaller material.

Linden Heights, Storm Water Sewer.

It is recommended that the request of Mr. Ralph L. Cheney, attorney, Linden Heights, be not approved, excepting as to extension of time within which to construct the storm water sewers.

The proposition to connect branch house sewers and cellar drains with the proposed storm water sewer which would be wholly dry, excepting the house sewage, for weeks and months at a time, is objectionable and unsanitary and is bound to be the cause of nuisance and offense to the people of the village, and the farms through which the outfall flows, even if not liable to cause disease.

Defiance, Sewer.

It is recommended that the city be permitted to connect branch sewers with the recently constructed storm water sewer in Fourth Street having its outlet into the Maumee River four miles above the state dam.

The description of the dam indicates that the pool formed above it will constitute a sedimentation reservoir in which a large amount of solids from the Defiance sewage will be precipitated and the degree of purification of the sewage by

subsidence, oxidation and septic action should be large, with a tight dam as stated in this instance and ordinary stream flow over the crest of the dam flow four miles below the sewer, it is doubtful if disease organisms from Defiance sewage will often be found below.

As analytical information of value to the Board, it is desirable to arrange for a few samples of water, dry weather flow, from the Fourth Street sewer, two miles down stream, at the dam, and two miles below the dam.

The city should be notified that in approving the present use of the storm water sewer as a carrier for house sewage, that at any time, the Board may require the city to intercept and treat the sewage before discharging it into the river, but that this is not demanded now.

Waverly, Water Purification Works.

It is recommended that the plan for removal of iron in solution from the ground water be approved and that the Roberts Filter Mfg. Company be required to submit to this Board through the Waverly officials, at once, a statement showing chemical reactions expected and percentage of iron which in its opinion will be removed from the well water.

New Philadelphia, Sewerage.

The city should be required to make contracts simultaneously for such additional sanitary sewers as may now be required and for sewage disposal works. If this requires a vote of the people, let such vote be ordered by council and taken. It is not in the power of council to enter into an arrangement with the State Board of Health as proposed by the consulting engineer, an approval of such an arrangement will be to allow the construction of sanitary sewers, and the discharge of untreated sewage for an indefinite time into the Tuscarawas River.

It is thought the voters of New Philadelphia will approve an issue of bonds sufficient to provide for sewage disposal works as well as for sewers, if the matter is clearly presented to them, and they are informed of the views of the Board in the matter.

The plan submitted does not contain any definite solution of the sewage problem and in approving it, the Board will be committed to the discharge of untreated sewage into the stream which is lower down drawn on for public water supply.

Ironton, New Water Supply.

It is recommended in this instance that the officials of Ironton be advised that the practical steps which they have already taken to increase the water supply of the city are not satisfactory from an engineering and biological point of view, that further extension of works on this line are not calculated to increase materially or insure the permanency or maintain the purity of the city water supply, and that prudence in the expenditure of public funds and conservation of the public health, clearly suggests that improvement of the city water supply should be sought in some other direction than by further exploitation of the gravel bar south of the city on the Kentucky side of the Ohio River. The natural course of procedure is clearly and forcibly presented in the report of the chief engineer of the Board, namely, by taking water from the Ohio River, subjecting it to careful filtration and thereby providing a supply satisfactory in quality, serving the highest ideals of hygiene and unlimited in quantity. The city can engage in this work with the assurance of complete success, and that no portion of the public funds so expended will be lost in the enterprise, and it is believed that the city officials should be directed to submit to this Board within ninety (90) days plans

for the purification of the Ohio River water before it is delivered to the distribution system.

It seems in this instance that the duty of the Board is to insist on compliance with its previous orders.

Respectfully submitted,

JOHN W. HILL,
Engineering Committee."

On motion of Dr. Warner, duly seconded, the report was approved with the exception of the recommendations in regard to the city of Iron-ton, this matter being disposed of later under the Bense propositions.

The Board took up the question of approving the detailed plans for wash water troughs, controllers, loss of head gages, and chemical feed suction tank, as well as plans for certain modifications in the general design of the filter units as originally approved, submitted on December 8th, 1910, by The Pittsburg Filter Manufacturing Company, contractors, for the village of Port Clinton.

It was moved by Dr. Warner and seconded by Dr. Crossland to approve these plans; as called for in the first condition of the Board's approval of the original plans, to-wit: That plans showing all details of piping and strainer system, controllers, and coagulant devices, as these are to be actually installed, be submitted to and receive the approval of the State Board of Health before the contract for the work is awarded.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The Secretary was instructed to call the attention of the authorities at Port Clinton to the second condition of the approval of the original plans, requiring the contractors to submit for the approval of the State Board of Health a copy of the guarantee which is called for in the engineer's specifications under which the plant is being built.

The filtering material proposed for the sewage purification plant for Marble Cliff was then considered.

It was moved by Dr. Crossland and seconded by Dr. Warner to approve the cinder filtering material proposed for use in the plant now under construction at Marble Cliff, as shown by samples submitted by Mr. E. G. Bradbury, consulting engineer for the village, January 9th, 1911.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The filtering material proposed for the sewage purification plant for Galion was then considered.

It was moved by Dr. Crossland and seconded by Dr. Warner to disapprove the filtering material submitted by Mr. A. O. Theobald,

city engineer, on January 6th, 1911, and to require that cinders or other filtering material be secured which is clean and contains no particles smaller than 1-8 inch in diameter.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The Secretary was instructed to inform the engineer and the contractor that they might feel free to call upon the Board, or its engineering department, at any time for suggestions regarding the best means of securing a suitable filtering material.

The request of Mr. Ralph L. Cheney, solicitor for the village of Linden Heights, for an extension of time for constructing a part of a proposed system of sewers for the village to May 1st, 1912, and also for permission to tap into this sewer for sink drainage, made January 11th, 1911, was considered.

It was moved by Dr. Warner and seconded by Dr. Crossland to grant the extension of time for completing the sewer to May 1st, 1912, but to refuse permission to tap the sewer for sink drainage.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the fact that the proposition to connect branch house sewers and cellar drains with the proposed storm water sewer which would be wholly dry, excepting the house sewage, for weeks and months at a time, is objectionable and unsanitary and is bound to be the cause of nuisance and offense to the people of the village.

The question of sewerage at Defiance was taken up.

It was moved by Dr. Crossland and seconded by Dr. Warner to approve the trunk sewer recently constructed in Fourth Street, Defiance, for the purpose of receiving the sewage from existing sewers in Wayne Street and Jefferson Street, and to notify the authorities of Defiance that the Board may at any time require the city to intercept and treat the sewage before discharging it into the river, but this is not demanded now.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The Board then took up the consideration of the plans for a softening and deferrization plant for the village of Waverly, consisting of sedimentation tanks and mechanical filters, as shown on plans submitted by The Roberts Filter Manufacturing Company on January 12th, 1911, at the direction of Mr. E. P. P. Smith, village clerk.

It was moved by Dr. Warner and seconded by Dr. Crossland to approve these plans upon the condition that this plant be installed and placed in operation before the water is offered to the consumers.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

The Secretary was instructed to notify the authorities that before this approval becomes effective, the Board must receive from them a statement showing chemical reactions expected and percentage of iron which in the opinion of the filter company will be removed from the well water.

The Board then considered the general plan for proposed sewerage for New Philadelphia, prepared by George E. Arnold, city engineer, and L. E. Chapin, consulting engineer, submitted December 12th, 1910; and also the suggested procedure for constructing the work, outlined in the report of the consulting engineer, accompanying said plans.

It was moved by Dr. Crossland and seconded by Dr. Warner to disapprove the construction of sanitary sewers previous to the beginning of work upon the sewage disposal plant, and to require that contracts be made simultaneously for such additional sewers as may now be required and for sewage disposal works.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland.

In the negative, none.

Dr. Warner, as chairman of the committee appointed to consider applications for a state plumbing inspector reported that the committee recommended the appointment of Wm. C. Groeniger of Dayton, his appointment to take effect February 15th, 1911; such inspector to be given an office in one of the laboratory rooms.

On motion of Mr. Hill, seconded by Dr. Crossland, the Board voted to adopt the report and appoint Mr. Groeniger as state inspector of plumbing.

The Secretary presented his report which, on motion of Dr. Warner, seconded by Dr. Crossland, was adopted.

The question of the water supply of Ironton was taken up for consideration. An opportunity having been given the said city through and by its officers to be heard, and the said officers filing no valid evidence, protest or remonstrance against the action or findings heretofore made by the State Board of Health, it was moved by Mr. Hill and seconded by Dr. Crossland that the report of the Board's committee, appointed under Section 1252, and the report of its chief engineer, and the recommendations therein contained, be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Crossland that the improvements and changes recommended in said reports be and the same are hereby declared to be necessary and should be made, and that the city of Ironton be required to install and have in operation

a water filtration plant, satisfactory to the State Board of Health, on or before December 1st, 1911.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon it was moved by Mr. Hill and seconded by Dr. Crossland that the report and findings of this Board be submitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

The complaint against the village of Marysville was taken up for consideration. The Secretary stated that the authorities of Marysville had been cited to appear at this meeting, but on the afternoon of the 25th, Dr. C. W. Hoopes, a member of council, had called upon him and had stated that council had authorized the employment of an engineer to prepare plans for a sewage disposal plant but such engineer had not yet been selected.

It was then moved by Dr. Warner and seconded by Dr. Crossland, an opportunity having been given the village of Marysville to be heard, and the village filing no valid evidence, protest or remonstrance against the action or findings heretofore made, that the report of the Board's committee and the recommendations therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Dr. Crossland that the improvements or changes recommended in said report be and the same are hereby declared to be necessary and should be made; to-wit: That the village of Marysville be required to install sewerage and sewage purification works, satisfactory to the State Board of Health, on or before November 1st, 1911.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon, it was moved by Dr. Warner and seconded by Dr. Crossland that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

The Secretary stated that notice had been sent to the authorities of Lima of the complaint heretofore filed with the Board and of its findings made after investigation thereof, and that representatives of Lima were present.

The President called for the representatives from Lima and there appeared before the Board Mr. George Dyer, mayor; J. W. Rowland, director of public service; W. J. McLaughlin, city solicitor; T. A. Collins and L. E. Justus, councilmen; H. L. Lawlor, city clerk, and A. L.

Metheany, city engineer. An opportunity was given the city of Lima, through and by its officers, to be heard regarding said complaint and discussion by the members of the Board and by the officials representing said city regarding said conditions was then had.

Upon such hearing being given, said officers filed no valid evidence, protest or remonstrance against the action or findings heretofore made. After such hearing, it was moved by Mr. Hill and seconded by Dr. Warner, that the report of the Board's committee and the recommendations therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Warner that it is hereby declared to be necessary that the city of Lima be required to construct and place in operation a water purification plant, satisfactory to the State Board of Health, by November 1st, 1911.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon, it was moved by Mr. Hill and seconded by Dr. Warner that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

The complaint against the city of Salem was taken up for consideration. The Secretary stated that in response to the notice citing the authorities of Salem to appear before the Board he had received a communication from the city clerk, Mr. James A Probert, under date of January 24th, 1911, acknowledging receipt of said notice to appear.

An opportunity having been given the city of Salem, through and by its officers, to be heard and the city filing no evidence, protest or remonstrance against the action or findings heretofore made, it was moved by Dr. Warner and seconded by Mr. Hill that the report of the Board's committee and the recommendations therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Mr. Hill that the improvements and changes recommended in said report be and the same are hereby declared to be necessary and should be made; to-wit: That the city of Salem be required to purify its sewage, in a manner satisfactory to the State Board of Health, on or before November 1st, 1911.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

Thereupon it was moved by Dr. Warner and seconded by Mr. Hill

that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill and Crossland. Nays, none.

The complaint against the village of Plymouth was taken up. The Secretary stated that in response to the notice citing the authorities of Plymouth to appear at this meeting, he had received a letter from E. K. Trauger, village clerk, under date of January 14th, 1911, stating that council waived its right of a hearing and that the village was about to take definite action towards securing a better water supply.

On motion of Dr. Warner, it was voted to postpone further consideration of this matter until the next meeting of the Board.

A communication was presented from Mr. E. G. Bradbury, consulting engineer for the city of Akron, requesting further time in which to properly study the conditions and development of the design proposed for the purification of the sewage of Akron; the city having purchased a site and appropriated the sum of \$10,000 for testing and experimental purposes.

On motion of Dr. Warner, seconded by Dr. Crossland, it was voted to grant a reasonable extension of time for this work.

The following petitions were presented from Reuben Murray, clerk of Washington Township, Lucas County, under the Bense Act:

That The N. Russell Sons Co., located in Lucas County, is polluting Ten Mile Creek and Sibley Creek with sewage and other wastes.

That The Leroux Cider and Vinegar Co., located in Lucas County, is polluting Ten Mile Creek and Sibley Creek with sewage and other wastes.

That the Albert Ruedy Packing House, in Lucas County, is polluting Ten Mile Creek and Sibley Creek with sewage and other wastes.

That the Zehner Brothers Packing Company, in Lucas County, is polluting Ten Mile Creek and Sibley Creek with sewage and other wastes.

That the Jacob Folger Packing House, located in Lucas County, is polluting Ten Mile Creek with sewage and other wastes.

That the city of Toledo is polluting Ten Mile Creek with sewage and other wastes.

These were referred to the chief engineer for investigation and report.

The Secretary presented a statement in regard to the distribution of antitoxin in other states.

The Secretary presented a complaint from the health officer of Cincinnati, Dr. J. H. Landis, that a hotel at Claire, Ohio, on the Norfolk and Western Railroad is preparing to discharge sewage into the Little Miami River.

The matter was referred to Mr. Hill as a committee of one to make the necessary investigation.

The Secretary presented a letter from Dr. Charles M. Hole of Cleveland, on of the medical inspectors, in reference to the per diem of medical inspectors.

On motion of Dr. Warner, seconded by Dr. Crossland, it was voted to rescind the former action of the Board fixing the per diem for medical inspectors at \$5, and to restore the former per diem paid, to-wit: \$10 per day for such inspectors.

The Secretary presented a communication from Mr. Burt R. Rickards, requesting the Board to pay him an additional months salary.

On motion of Dr. Warner, it was voted to return the communication to Mr. Rickards.

The Secretary presented a communication from Mr. Pratt, the chief engineer, in regard to the blanks used for securing information in reference to water works plants.

On motion of Mr. Hill, it was voted to request Mr. Pratt to make up a new blank covering strictly sanitary matters in the inquiry and to submit it to the Board at a later meeting.

The Secretary presented a communication from Mr. P. A. Mandabach, Secretary-Treasurer of the National Association of Pharmacologists, asking the Board to endorse a bill (H. B. 139) to amend Section 12664 of the General Code relating to the careless and indiscriminate distribution of samples of patent medicine, etc.

No action was taken.

The Secretary presented a list of health officers, appointed by their respective councils, to serve in lieu of a board of health.

On motion of Dr. Warner, seconded by Dr. Crossland, these health officers were approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hill and Crossland. In the negative, none.

The Secretary presented a communication from the International Reform Bureau, asking the Board to prepare and publish a leaflet in the interest of public education on the nature and extent of venereal diseases; and also a copy of House Bill 31 to amend sections of the General Code relating to marriage, procurement of marriage license and penalty for violation of marriage laws.

No action was taken. Mr. Hill suggested that copies of the bill be secured and sent to the members of the Board.

The Board then adjourned to meet at the Algonquin Hotel, Dayton, Ohio, at 7:30 p. m., February 23rd, 1911.

Attest:

C. O. PROBST, *Secretary*.

Approved March 2nd, 1911.

MARCH 2nd MEETING

1911

[NOTE.—The meeting set for February 23, 1911, was postponed to March 2, 1911, and place of meeting changed from Dayton to Cincinnati. Secty.]

A meeting of the State Board of Health was held at the Hotel Sinton, Cincinnati, March 2nd, 1911, at 7:30 P. M.

There were present Drs. Miller, Warner, Hasencamp, Grube, Sutton and Mr. Hill. Mr. Hartzell was absent on account of illness.

Mr. W. J. McLaughlin, solicitor, and Mr. George Dyer, mayor, of the city of Lima, appeared before the Board and stated that they wished to serve notice of appeal, in accordance with the provisions of Sections 1257 and 1258 of the General Code, to the recent order of the State Board of Health requiring the city of Lima to install a water purification plant. This notice was recorded without further action.

Mr. Wm. G. Clark, consulting engineer, was present and addressed the Board in reference to plans for increasing the size of the water filtration plant of the city of Toledo.

Mr. Hill stated that plans for this improvement in the filtration plant at Toledo had been submitted to him as engineering committee and that he would move that the Board approve the plans submitted by Mr. Clark on February 18th, 1911. This motion was seconded by Dr. Sutton.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Sutton and Hill. In the negative, none.

Mr. Hill then spoke of a bill before the legislature for the abandonment of that portion of the Miami and Erie Canal within the city of Cincinnati, and offered the following resolution, moving its adoption:

"Be it Resolved, If the Legislature in its wisdom decides to abandon the Miami and Erie Canal within the city of Cincinnati and to turn the waters of the canal into Mill Creek at some point north of Mitchell Avenue, or north of the city boundary, that it is desirable that such connection with Mill Creek be made north of the village of Carthage, at or near the location of the lower so-called Lockland aqueduct."

The Rev. Dr. Robertson of Cincinnati being present was called upon for remarks and endorsed the proposal of Mr. Hill as embodied in his resolution. Mr. Hill also presented a letter from Mr. H. R. Probasco of Cincinnati, and a copy of remarks made by Dr. A. B. Thrasher of Cincinnati at a public hearing before the Cities Committee of the House of Representatives, at Columbus, on the bill in question.

These were received and filed.

Mr. Hill's motion for the adoption of the resolution was duly seconded and carried.

The Chair referred the matter to the following committee, which was instructed to investigate the canal conditions and report their findings to the Board on March 18th, 1911; to-wit, Mr. Hill, Dr. Hasencamp and Dr. Grube.

Mr. Hill requested that the Secretary send a copy of the Board's action to the Hon. Edward K. Bruce of the House of Representatives, author of the bill for the abandonment of the canal; and to suggest that further action on the bill be postponed until after the Board's meeting on the 18th instant.

Mr. J. N. Chester of Pittsburg, consulting engineer for East Liverpool, presented his plan for the development of a public water supply for that city to be derived from wells located along the bank or in the bed of the Ohio River.

After some discussion, this matter was referred to executive session.

Dr. W. H. Knauss, health officer of Newark, addressed the Board in regard to the water purification plant for that city and suggested that the Board should require the city to increase the size of the present plant. He further requested that additional bacteriological tests be made to show the result of the filters now in use.

The Board then went into executive session.

The question of Lima's appeal to the order of the Board requiring the water purification plant was taken up.

Mr. Hill strongly opposed the principle of permitting the orders of the Board in such cases to be modified or set aside by a board of engineers, called possibly from another state, for the purpose of arbitration. He moved that the Board take no further action in regard to the appointment of a referee for Lima at this time and that the Secretary be instructed to prepare an amendment to the Bense Act giving the Common Pleas Court authority to hear appeals to the Board's orders in such cases.

This motion was seconded and carried.

The minutes of the last meeting were read and approved.

Dr. Warner, chairman of the Finance Committee, presented a list of vouchers showing expenditures made from January 15th to February 15th, 1911. He also presented a requisition for \$200 for file cases, books and office furnishing for the state inspector of plumbing.

On motion of Mr. Hill, the report was adopted and the requisition for \$200 for the plumbing inspector allowed.

As chairman of the Executive Committee, Dr. Warner reported that he had appointed James Robinson as stenographer, at a salary of \$55 per month; and Margaretta Schofield as messenger and mailing clerk at a salary of \$40 per month.

He then presented the following resignations:

L. V. Parker, bacteriologist, to take effect March 14th, 1911.

Albert J. Slack, chemist, to take effect March 14th, 1911.

Raymond W. Ferris, assistant engineer, to take effect on March 23rd, or at such earlier date as may suit the pleasure of the Board.

It was moved by Dr. Sutton and seconded by Mr. Hill that these resignations be accepted.

The motion was carried.

Dr. Warner presented the recommendation of the executive committee that L. H. Van Buskirk be appointed assistant engineer to fill the vacancy occasioned by the resignation of Mr. Ferris, at a salary of \$80 per month.

Mr. Hill moved that this recommendation of the Executive Committee be adopted.

The motion was seconded and carried.

Mr. Hill moved that the Executive Committee be authorized to find men to fill the vacancies in the laboratory created by the resignation of Mr. Parker and Mr. Slack, and report to the Board at its next meeting, such appointees to be engaged at the present salaries if possible, but if necessary the Executive Committee be authorized to offer not to exceed \$2,500 a year for the services of a bacteriologist, and that the committee be empowered to visit such places as might be necessary to secure suitable men for these positions.

This motion was seconded by Dr. Sutton and carried.

The Executive Committee then recommended the following changes in salaries and titles of employes, to-wit:

That Miss Halderman be made correspondence clerk at a salary of \$1,000 a year.

That Miss Dwight be made general clerk, at the same salary as at present, \$60 per month.

That the salary of Miss Fisher, recording clerk, be fixed at \$1,200 a year.

That the salary of J. P. Van Wirt, assistant chemist, be increased to \$75 a month.

That the salary of the two laboratory helpers, be increased to \$40 a month each.

On motion of Dr. Sutton, seconded by Mr. Hill, these recommendations were adopted and the changes ordered made.

Dr. Warner offered a resolution in regard to what should be the guiding policy of the Board in the employment of its employees, which was seconded by Dr. Grube. After some discussion the resolution was withdrawn.

Mr. Hill, as Engineering Committee, presented his report and the questions were taken up as follows:

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for a proposed water supply for the village of Lowellville, to

be derived from flowing wells located about one and one-half miles north of and some 250 feet above the elevation of the village, as shown on drawings submitted February 15th, 1911, by Mr. John P. Bracken, vice-president of the Lowellville Water Company, and Mr. J. Richard Kommer, engineer for the company; upon the condition that the supply be installed before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for a water supply for Amherst, as shown on drawings submitted January 2nd, 1911, by Mr. Jacob Baus, secretary of The Amherst Water Works Company, and prepared by the Aetna Engineering Bureau of Chicago; said supply to be derived from the Elyria water works.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve a recently constructed dug well at Millerburg, to be used as an additional water supply for the village, said well being located in the valley of Kill-buck Creek just north of the village and about 100 feet west of the original source of supply.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner and duly seconded, that the question of sewerage for the North Side Sewer District at Covington, Miami, County, be referred to a committee consisting of Mr. Hill and the chief engineer, for further investigation and report.

The Board then took up for consideration the plans submitted February 17th, 1911, by Mr. C. V. Beatty, director of public service, and Mr. J. N. Chester of Pittsburg, consulting engineer, for developing a public water supply for the city of East Liverpool, to be derived from wells located along the bank or in the bed of the Ohio River.

It was moved by Mr. Hill and seconded by Dr. Sutton to permit the city to proceed with the proposed plan with a view to installing a well water system provided it is shown by proper tests that a sufficient quantity of water of satisfactory quality can be secured in this manner; the results of such test to be laid before the State Board of Health for its approval before use of this supply is made.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for a sewage purification plant for Bryan, as shown on draw-

ings submitted by The Riggs and Sherman Company, consulting engineers, February 13th, 1911, and to be located on the site shown on the trunk line sewer plan submitted June 28th, 1910, provided:

1st. That the village purchase at least five acres of ground as a site for the purification plant;

2nd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;

3rd. That detailed plans of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed;

4th. That the capacity of the dosing tank be enlarged so that each filter will be flooded to a depth of at least 2 inches at each dose; and,

5th. That this approval be void unless construction of the plant is begun before January 1st, 1912.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans and specifications for sewerage and sewage purification for the village of Chardon, as submitted by Mr. B. F. Hewit, consulting engineer, January 25th, 1911, provided:

1st. That the village purchase at least five acres of ground as a site for the purification plant, in order to provide for future extension and to control the use of the land immediately adjoining the plant;

2nd. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed;

3rd. That detailed plans for dosing apparatus be submitted to and receive the approval of the State Board of Health before being installed; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

Mr. Hill recommended that the plans for purification of the water supply for Niles be not approved until he had had ample time to examine and report upon the same.

It was moved by Mr. Hill and seconded by Dr. Sutton that the new source of water supply proposed for Lodi, as shown on plans submitted by Mr. L. E. Chapin, consulting engineer, January 12th, 1911, be disapproved unless a filtration plant, of a design satisfactory to the State Board of Health, be included in the plans, and that approval even with such filtration plant be withheld until:

1st. Thorough investigations have been made with reference to securing a suitable ground water for the village; and

2nd. The consulting engineer has made a careful investigation and report to the Board of the yield from the 116 acres of watershed from which it is proposed to furnish a supply of 100,000 gallons per day; such investigation to include observations of the flow of the proposed springs as well as the average dry weather flow of the small streams upon which the impounding reservoir is to be located.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for a new sewage purification plant for the city of Delaware, as shown on drawings submitted by The Riggs and Sherman Company of Toledo, consulting engineers, February 23rd, 1911, provided:

1st. That detailed plans of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed;

2nd. That at least ten acres of ground be purchased as a site for the purification plant;

3rd. That samples of the filtering material to be used be submitted to and receive the approval of the State Board of Health; and,

4th. That this approval be void unless construction of the plant is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

Mr. Hill reported that before the Board approved the use of chloride of lime for disinfecting the water of Newark, he was of the opinion that a more definite statement should be made of how and in what proportion chloride of lime is to be applied; and that before any practical device is adopted by the city reasonable tests should be made by an experienced man and a report made to this Board.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for an intercepting sewer and sewage purification plant for Bucyrus, as shown on drawings submitted by The Riggs and Sherman Company of Toledo, consulting engineers, February 23rd, 1911, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That twenty-five acres of land be purchased as a site for the purification plant;

3rd. That all future sewers in Bucyrus be built on the separate plan, and that plans therefor be submitted to the State Board of Health for approval whenever construction is contemplated; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner that the question of additional sewerage for Coshocton be referred to a committee consisting of Dr. Sutton and the chief engineer for further investigation and report.

This motion was seconded and carried.

Mr. Hill recommended that the authorities of Fort Recovery be requested to send their engineer to Columbus to confer with the chief engineer of the State Board of Health in reference to a suitable sewerage system for the village, and that he bring with him a topographical map, or a map of the corporation showing elevations to the point of proposed outfall of the sewers; and that the officials be advised that if the topography is not too flat storm water sewers may not be a present necessity, and if the sewerage is designed principally for sanitary purposes it should be carried out on a sanitary system, and the point of outfall should be selected so as to admit of the interposition of sewage disposal works should the same be found necessary in the future.

Mr. Hill reported that he had investigated the complaint that the Norfolk and Western Railroad Company was preparing to discharge sewage from a hotel at Claire, Ohio, into the Little Miami River, and moved that the Secretary be instructed to notify the company's engineer, Mr. Charles S. Churchill, at Roanoke, Va., that the company would be required to submit plans for a sewage disposal plant to take care of the sewage from this hotel before permitting it to enter the Little Miami River.

On motion of Dr. Grube, duly seconded, this motion was carried.

The Secretary presented a communication from J. F. Kuhns, city solicitor of New Philadelphia, requesting the Board to act upon the sewerage and sewage disposal plans previously submitted, and stated that the city was ready to make both of these improvements at the same time.

It was moved by Mr. Hill and seconded by Dr. Sutton that the general plan for proposed sewerage for New Philadelphia, prepared by Mr. George E. Arnold, city engineer and Mr. L. E. Chapin, consulting engineer, and submitted December 12th, 1910, be approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

A report by the engineer was presented on the water supply of Loveland, in which it was shown that impure river water was made use of as an auxilliary supply and that an additional pump which had been purchased had not been installed in spite of the fact that the attention of the water works authorities at Loveland had been called to the nec-

essity for an additional pump on several occasions, to prevent use of the river water.

On motion of Mr. Hill, the Secretary was instructed to issue an order requiring this additional pump to be installed without further delay.

A report by the chief engineer on water works conditions at Apple Creek was presented. From this report it was clear that the conditions under which the supply was approved by the Board in July 1909, relating to the construction and maintenance of privies in the vicinity of the spring had not been complied with in spite of repeated notices from our Board and promises on the part of the village officials. It was therefore recommended that the matter be placed in the hands of the Attorney General for action with reference to forcing the village to comply with the conditions of approval and to properly protect the water supply.

It was moved by Dr. Warner that this recommendation be adopted.

The motion was seconded and carried.

A report by the chief engineer on proposed water supply for Utica was presented, but as several minor improvements were to be made in the construction work, the construction having been started before the question was submitted to the State Board of Health, it was recommended that formal consideration of the plans be withheld until June 1911, before which date one or more inspections of the completed works will be made in order to ascertain that the water works are in every way satisfactory before they are definitely approved.

On motion of Mr. Hill action was deferred in this case.

A report of the chief engineer upon existing sewerage conditions at Elyria was presented, in which attention was called to the ignoring of the condition under which plans for improved sewerage were approved in 1905, requiring plans for sewage purification works to be prepared and presented to the Board.

The matter was referred to the Engineering Committee for investigation and report.

The Secretary then presented his monthly report; and recommended that some rules and regulations be formulated governing the duties of the newly appointed state plumbing inspector.

Mr. Hill moved that a committee of two be appointed to formulate such rules with the plumbing inspector.

This motion was carried and the Chair appointed Drs. Warner and Sutton to serve on this committee.

The Secretary presented a petition from the board of health of the city of Defiance, Defiance County, asking the Board to investigate their public water supply, which they believed to be impure and dangerous to the health of the consumers.

This matter was referred to the chief engineer for investigation and report.

The Secretary presented a petition from the board of health of the village of Geneva, Ashtabula County, asking the Board to investigate the conditions of Cowles Creek which they allege is corrupted by the sewage of the village of Geneva, and is detrimental to the health and comfort of the citizens of the village who reside in the vicinity of said creek.

This matter was referred to the chief engineer for investigation and report.

The Secretary presented a communication from Mr. William H. Gould, engineer for Copland Heights, near Toledo, requesting the State Board of Health to declare it necessary to construct a county sewer under the provisions of Section 6596 of the General Code.

On motion of Dr. Sutton, duly seconded, this matter was referred to Dr. Hasencamp and the chief engineer for investigation and report.

The Secretary presented the following list for renewal of a license to conduct a maternity boarding house and lying-in hospital, which had been properly approved by the local health authorities of the respective communities:

Mrs. Mary E. Throp, Jason Avenue, Clinton Township, Franklin County. Station B., Columbus.

Mrs. Zella Briggaman, 1432 East Rich Street, Columbus.

Mrs. Nora Foster, 42 West Oakland Avenue, Columbus.

Mrs. Celia P. Fyler, 964 Highland Street, Columbus.

Ida Prickett, 639 West Sixth Street, Cincinnati.

The Catherine Booth Home for Girls, N. E. Cor. Gilbert Avenue and Windsor Street, Cincinnati.

Anna L. McNairy, 322 West Fourth Street, Cincinnati.

Mrs. Elizabeth Steinhauer, 2083 W. 26th Street, Cleveland.

Mrs. James T. Black, 633 West Spring Street, Lima.

It was moved by Mr. Hill and seconded by Dr. Sutton to grant these renewals.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

The Secretary then presented the application of Mrs. Estelle Farnsworth, Main Street, Bristolville, Trumbull County, to conduct a maternity boarding house and lying-in hospital, her application having been approved by the local authorities.

It was moved by Mr. Hill and seconded by Dr. Grube to grant this license.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

The Secretary presented a list of persons who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Mr. Hill and seconded by Dr. Grube to approve these health officers.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The Secretary presented an amendment to Section 16 of the orders and regulations adopted October 27th, 1906, by the health officer of Fayette, said amendment reading "And no fertilizer shall be stored within the village of Fayette, Ohio, except by permission of the health officer," adopted February 1st, 1911, by Benjamin Stoner, health officer.

It was moved by Mr. Hill and second by Dr. Grube to approve this order.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hill and Sutton.

In the negative, none.

The Secretary presented Senate Bill No. 75, opposing vaccination, with a letter from Dr. Ben McClellan, chairman of the legislative committee of the Ohio State Medical Association, asking what the attitude of the Board was in reference to such bill.

On motion of Mr. Hill, the Secretary was instructed to notify the author of the bill that it does not meet with the approval of the State Board of Health.

The Secretary presented a letter and the following resolution adopted by the Academy of Medicine of Toledo and Lucas County:

WHEREAS, That dread disease trachoma, (commonly called "Granulated lids"), the ancient and present scourge of India and Egypt and the greatest menace to industrial efficiency on the Continent, has been found to be present among the foreign population of this city, especially on the East Side;

WHEREAS, Prevention is immensely easier, cheaper and more effectual than cures,—and the German Government has been spending thousands of dollars in treating the cases in their country and attempting to stamp out the spread;

Therefore be it Resolved, That the Academy of Medicine request the State Board of Health to declare this a contagious and communicable disease and that the attention of the public be called to the economic necessity of beginning treatment of the cases now known and measures taken to prevent its further spread.

On motion of Mr. Hill, it was voted to place trachoma on the list of diseases which physicians are required to report to the local health authorities and to appoint Dr. Hasencamp a committee of one to investigate and report to the Board upon the prevalence of trachoma in Toledo, Toledo.

The Secretary presented an invitation from The Commercial Club of Cincinnati, requesting the Board's attendance at a dinner, Saturday, March 18th, at 6:30 p. m. at the Queen City Club.

On motion of Mr. Hill, seconded by Dr. Grube, the invitation was accepted.

Dr. Sutton spoke of the reported prevalence of typhoid at New Concord, and asked for information as to what members were expected to do when such reports were made to them. No action was taken.

The question of requiring the village of Plymouth to secure a better water supply was postponed.

The Board then adjourned to meet in Cincinnati at 2 p. m. March 18th, 1911.

Attest:

C. O. PROBST, *Secretary*.

Approved March 18th, 1912.

MARCH 18th MEETING

1911

A meeting of the State Board of Health was held at the Hotel Sinton, Cincinnati, March 18th, 1911, at 2 p. m.

There were present Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Mr. Hartzell was absent on account of illness.

A delegation from Cincinnati was present and took up the question of a bill before the Legislature for the abandonment of that part of the Miami and Erie Canal within the city limits. Remarks were made by Dr. J. H. Landis, health officer of Cincinnati; Mr. Edward K. Bruce, author of the bill, and others.

Dr. Landis presented the following resolution in regard to this, which had been adopted by the board of health of Cincinnati:

WHEREAS, Investigation of conditions along the Miami and Erie Canal reveal numerous ocular evidences of pollution of that stream, and bacteriological examination furnishes abundant scientific proof of such pollution;

Therefore, be it resolved, by the board of health of the city of Cincinnati, that in consideration of the examination made which has been presented to this board by the health officer, the members of the board of health of the city of Cincinnati are convinced that the present condition of the canal, resulting from its use for sewerage purposes, is a positive and constant menace to the health of the citizens of our city and should be abated; that the State Board of Health is strongly recommended and urged to adopt such action as will change its present offensive condition and eliminate it as a possible source of future nuisance and that this Board is ready and willing to coöperate in any way in effecting the desired object.

MAJOR FRANK JONES,
DR. G. A. FACKLER,
DR. JOHN MILLER,
DR. E. W. WALKER.

A second delegation, representing the Avondale Improvement Improvement Association, appeared before the Board in regard to alleged nuisances which had been annoying the citizens of Clifton and Avondale for many years, arising from bad odors from certain reduction plants located in the villages of St. Bernard and Carthage, and asked for some assistance from the Board in abating these nuisances.

The President appointed Mr. Hill and Dr. Grube a committee to investigate the complaint and report to the Board.

The Board then went into executive session.

Dr. Warner, as chairman of the Finance Committee, presented a listed of vouchers which had been issued from February 16th to March 15th, 1911.

This was approved.

He then reported, as chairman of the Executive Committee, that it had been recommended to the Legislature that the salary of the messenger and mailing clerk be raised from \$40 to \$55 per month; that the salary of the epidemiologist be fixed at \$2,500 per annum; and the salary of the bacteriologist be fixed at \$3,000 per annum; the last two items having been agreed upon by the members to whom the question had been submitted by mail: The committee had also recommended to the Legislature that an additional stenographer be engaged at a salary of \$50 per month.

He further reported that the Executive Committee recommended the selection of Miss Martha Koehne as chemist, at a salary of \$1,400 per annum.

On motion of Dr. Sutton, seconded by Dr. Hasencamp, the report of the Executive Committee was adopted and approved.

Mr. Hill then brought up the question of appointing delegates to the meetings of the Conference of State Boards of Health and the American Public Health Association.

It was moved by Mr. Hill and seconded by Dr. Sutton that the President, Vice-President and Secretary in office at the March meeting each year, or their successors in office, be appointed to represent the Board each year at the meeting of the Conference of State Boards of Health and at the meeting each year of the American Public Health Association.

This motion was carried.

On motion of Dr. Sutton it was voted to hold the meeting with the boards of health of cities and villages of the northern half of the State in Cleveland, in connection with the meeting of the State Board in the third week of July, 1911, and the President and Secretary were authorized to prepare the program.

*On motion of Dr. Warner it was voted to hold the monthly meeting for April in Zanesville, on Thursday, the 20th, at 8 p. m.

On motion of Dr. Sutton it was voted to hold the May meeting in Cleveland on May 9th, at 8 p. m., at the Hollenden Hotel.

The Engineering Committee, Mr. Hill, reported that but one report had been submitted to him and that was in regard to a water purification plant for the city of Niles; that this report had been received too late for consideration, and he asked the privilege of making report and securing vote by letter ballot.

On motion, this privilege was granted.

*Meeting changed to Cleveland on recommendation of the Executive Committee.

The question of the abandonment of the Miami and Erie Canal as contemplated in the Bruce Bill was then taken up for consideration.

Mr. Hill offered the following resolutions and moved their adoption. The motion was seconded by Dr. Sutton:

Resolved, That it is the sense of the State Board of Health that the continuance and maintenance of the Miami and Erie Canal within the limits of Cincinnati is a nuisance, and inimical to the health of the people living adjacent thereto; and that as a sanitary measure it is desirable to abandon the canal within the limits of the city; also that the Secretary of this Board be instructed to transmit a copy of this resolution to the Speaker of the House of Representatives and the President of the Senate, at his earliest convenience.

Resolved, That if within the wisdom of the Legislature the abandonment of the canal within the limits of Cincinnati should be provided by law, it is desirable for the broadest sanitary benefit to the territory and villages adjacent to the city of Cincinnati that the connection between the Miami and Erie Canal and Mill Creek be made at the lower Lockland aqueduct, and that the Secretary of this Board be instructed to transmit a copy of this resolution to the Speaker of the House of Representatives and the President of the Senate, at his earliest convenience.

This motion was carried.

A petition was presented from the health officer of Zanesville, complaining that the public water supply of the city of Zanesville is impure and dangerous to the health of the consumers of said supply. The Board having before it a report of the investigations made by the State Board of Health of the public water supply of Zanesville during the past twelve years, the same was on motion of Dr. Sutton, seconded by Mr. Hill, ordered read.

The report was then read and it was moved by Dr. Sutton and seconded by Mr. Hill that the Board does find, from its investigations, and other evidence, that the public water supply of Zanesville is impure and dangerous to health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Nays, none.

It was then moved by Dr. Sutton and seconded by Mr. Hill that the authorities of the city of Zanesville be notified of said findings and be given an opportunity to be heard at this meeting, and to show cause, if any, why the said city should not be required to seek a new public water supply or install and place in operation water purification works.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Nays, none.

Thereupon, Mr. Earl E. Everett, director of public service of Zanesville, appeared before the Board and presented a resolution adopted by the council of the city of Zanesville, authorizing him to represent said

city regarding said complaint. An opportunity was given the city of Zanesville, by and through its officer, to be heard regarding said complaint and discussion by the members of the Board and by the official representing said city regarding said conditions was then had.

Upon such hearing being given, said official admitted that the present public water supply of Zanesville is impure and offered no evidence, protest, or remonstrance against the findings heretofore made. After such hearing, it was moved by Dr. Sutton and seconded by Mr. Hill, that the report and findings therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Nays, none.

Thereupon, it was moved by Dr. Sutton and seconded by Mr. Hill that the following improvements or changes are hereby declared to be necessary and should be made, to-wit: That the city of Zanesville be required to seek a new source of public water supply and place the same in use by January 1st, 1912; or install and place in operation water purification works, satisfactory to the State Board of Health, to purify the present supply, by January 1st, 1912.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Nays, none.

Thereupon it was moved by Dr. Sutton and seconded by Mr. Hill that the findings of the Board be submitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp. Nays, none.

The Secretary reported that Mr. Green, president of the Commercial Club, had telephoned that a committee would call for the members of the Board at 6:15 to conduct them to the Queen City Club for the dinner at 6:30, that he desired the Board to appoint two or three speakers for the evening and that he had asked him to inform the Board that the Commercial Club looking upon the members of the Board as their guests had arranged to pay all expenses, including railroad fares, for the visit to Cincinnati.

On motion of Dr. Warner, it was voted that the members should pay their own expenses and that this kind offer be declined with thanks.

The President then appointed Mr. Hill, Dr. Warner and Dr. Hasencamp as speakers for the evening.

The report of the special committee, Dr. Sutton and the chief engineer, in reference to plans for additional sewerage for Coshocton, was presented.

On motion of Dr. Warner it was voted to postpone action on this matter until the next meeting.

Dr. Hasencamp reported that he had made investigation in regard to the presence of trachoma in Toledo, as instructed to do at the last meeting, but needed further time in which to present a complete report.

On motion of Dr. Warner, the committee was continued and further time granted.

The report of the special committee, Dr. Hasencamp and the chief engineer, appointed to investigate the request from the commissioners of Lucas County and owners of land located along the Maumee River a short distance from Toledo for the building of a county sewer in Lucas County was presented.

It was moved by Mr. Hill, and seconded by Dr. Sutton, that, by virtue of its authority under Section 6596 G. C. the Board resolve that a main sewer, for sanitary purposes, is necessary in the district lying on the westerly side of the Maumee River from the southerly corporation line of the city of Toledo to a point at least one and one-half (1 1-2) miles up-stream from the city water works intake, said district being described in detail in the report of the Board's committee.

Those voting in the affirmative were Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp.

In the negative, none.

The Secretary was instructed to notify the county commissioners of this action in order that they might cause the necessary surveys and plans to be prepared, which plans when completed should be submitted to the Board for approval before being carried out.

The Secretary presented an amendment to the Bense Act, which he had been instructed to prepare, in reference to appeals allowed under the act to orders of the Board.

Mr. Hill moved that the amendment be adopted. There being no second, no further action was taken.

The Secretary presented a letter from Mr. Pratt, requesting certain changes in the terms of his appointment as chief engineer.

On motion of Mr. Hill, seconded by Dr. Sutton, the request was refused.

Dr. Sutton reported that there had been an outbreak of typhoid fever at New Concord, a village in Muskingum County, with thirty-one cases to date; that there was some trouble in regard to securing a suitable man for health officer.

The Secretary reported that Mr. J. B. Campbell had been appointed by council as health officer in lieu of a board of health, and the question of his confirmation was presented to the Board.

On motion of Dr. Warner, duly seconded, it was voted to disapprove this appointment on the ground that in this emergency the health officer, if possible, should be a physician.

On motion of Dr. Warner, duly seconded, the question of a health officer for New Concord and of measures necessary to suppress the

typhoid fever epidemic, was referred to Dr. Sutton as a committee of one with power to act.

The Secretary presented a list of health officers, who had been appointed by council to serve in lieu of a board of health in their respective villages.

It was moved by Mr. Hill and seconded by Dr. Warner that these health officers be approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hill, Sutton, Grube and Hasencamp.

In the negative, none.

The Secretary then presented the following applications for a renewal of license to conduct a maternity boarding house and lying-in hospital:

Mrs. Mary Howard, at 430 Clark Street, Cincinnati.

Mrs. Amelia Eble, at 4720 Ravine Street, Cleveland.

Mrs. Ida Dewey, at 7804 Kinsman Road, Cleveland.

Salvation Army Maternity Hospital, 5905 Kinsman Road, Cleveland.

Woodhill General Hospital, at 3152 East 93rd Street, Cleveland.

Mrs. M. E. Huffman, 3142 West 70th Street, Cleveland.

It was moved by Dr. Warner and seconded by Dr. Sutton to renew the licenses granted to the above named applicants.

Those voting in the affirmative were Messrs. Warner, Miller, Hill, Sutton, Grube and Hasencamp.

In the negative, none.

The Secretary stated that a new method had been proposed for distributing diphtheria antitoxin.

On motion of Mr. Hill, this matter was referred to the President and Secretary with power to act.

The minutes of the last meeting, March 2nd, were read and approved.

The Board then adjourned.

Attest:

C. O. PROBST, *Secretary*.

Approved April 21st, 1911.

APRIL MEETING

1911

*A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, Thursday, April 20th, at 8 p. m.

There were present Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.*

Mr. W. J. McLaughlin, city solicitor, and Mr. J. W. Rowlands, director of public service, of Lima, were present and asked the Board to approve a general plan, details of which to be furnished later, for purifying the public water supply of that city by the addition of hypochlorites.

Judge S. H. Nichols, representing the city of Coshocton, addressed the Board in regard to the necessity of additional sewerage for that city, plans for which had been submitted to the Board some time before. He urged that these plans be approved with the understanding that sewage purification would follow without much delay.

Dr. F. M. Marshall, health officer, and Mr. J. M. Stuart, member of council of Coshocton, also spoke, urging approval of the plans.

Dr. L. W. Campbell, mayor of Ada, addressed the Board in regard to its order requiring the village of Ada to install a sewage purification plant. He argued that this was practically impossible on the part of the village from lack of funds and, furthermore, urged the uncertainty as to just what the income of Ada would be in the pending changes in tax laws.

After some discussion, the Board adjourned to meet at 9:30 a. m. the following day.

SECOND SESSION.

APRIL 21ST, 1911, 9:30 A. M.

The Board re-assembled Friday morning, April 21st, at 9:30 o'clock. There were present Drs. Miller, Warner, Hasencamp, Grube and Mr. Hill.

The Board went into executive session.

The question of additional sewerage for Coshocton was taken up and it was moved by Mr. Hill and seconded by Dr. Grube to approve the plan submitted by Mr. A. M. Fisher, city engineer, February 25th, 1911, for sewerage the southeastern portion of the city of Coshocton.

*On recommendation of the Executive Committee, the place of meeting was changed from Zanesville to Cleveland.

with outlet into the Muskingum River, upon the condition that plans for a sewage disposal plant be submitted to the State Board of Health within the next eighteen months.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill.

In the negative, none.

The Board then took up the question of its order requiring the village of Ada to construct a sewage purification plant.

On motion of Mr. Hill, duly seconded, it was voted to extend the time at which this order should take effect to a date to be fixed by the Board at a subsequent meeting.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Miller, Warner, Hasencamp, Grube and Hill. Nays, none.

The minutes of the March 18th meeting were read, and on motion approved.

Dr. Warner, as chairman of the Finance Committee, submitted a list of vouchers showing expenditures made from March 16th to April 15th, 1911, and balances on that date.

On motion of Mr. Hill this report was received and ordered filed.

Mr. Hill then presented the following report:

APRIL 19, 1911.

"To the Hon. State Board of Health, Columbus, O.

GENTLEMEN:—The Engineering Committee would respectfully submit the following report on the matters submitted for consideration since the last meeting of the Board:

Pollution of Cowles Creek at Geneva:

It is recommended that no action in this matter under the Bense law be taken until the Supreme Court has declared the Bense Act to be a good law."

(The committee appointed by the Board to investigate the complaint of the board of health of Geneva in regard to the pollution of Cowles Creek at Geneva, reported that there was found no ground for the Board's taking action under the Bense Act. The committee did find, however, that the filters are being overworked and the enlargement of the present plant, or a new plant farther from the village, will undoubtedly be necessary in the near future).

"Green County Children's Home, Xenia. Proposed Sewerage and Sewage Purification.

The report of the chief engineer is approved with the further recommendation that the filtering materials employed be submitted to the chief engineer for examination and approval before use, and if in his judgment "fine or coarse coke" will answer the purpose better than the "sand" specified, that the same with "due discretion" be substituted for sand.

(It was moved by Dr. Grube and seconded by Dr. Hasencamp that the plans for sewerage and sewage purification for the Greene County Children's Home, as shown on drawings and described in specifications submitted by Mr. A. Elliott Kimberly, consulting engineer, March 20th, 1911, be approved upon the conditions:

1st. That the filtering material employed be submitted to the chief engineer of the State Board of Health for approval before use, and if in his judgment "fine

or coarse coke" will answer the purpose better than the "sand" specified, that the same with "due discretion" be substituted for sand; and

2nd. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, and Hill. In the negative, none).

"Lima. Purification by the Hyppochlorite of Lime Process.

The Engineering Committee has read all available literature on the so-called "chloride of lime" treatment of polluted water for removal of bacteria, and is not yet satisfied that this process can be given the seal of approval of the Board. The experiments of Mr. George A. Johnson at the Chicago stock yards and on the Jersey City water supply, and of others, are very interesting and may point the way to a cheap method of bacterial reduction of polluted water. But at present the evidence is too meagre to justify this Board in a broad approval of this method of water purification, and your committee would therefore respectfully recommend that in replying to the request of the city of Lima to approve the method, that the Secretary be instructed to state to the officials of that city the views of the Board on the "chlorine" treatment, and to suggest that while withholding approval of this method of water purification as being best adapted to the needs of the city, will be very glad to see the city of Lima make an experimental investigation of the method on the reservoir water, run through a period of four to six months, and to report the results of the analyses of water before and after the treatment, including in the reports all numbers that may be affected by the treatment and submit the same from day to day to the technical staff of the Board and to the Engineering Committee. Such experiment to be conducted by someone thoroughly conversant with the "chlorine" treatment. Your committee is thoroughly of the opinion that the "chloride" of lime treatment is not only not thoroughly understood by its champions at the present time, but there is an element of danger connected with it, that careful experiment and time only can remove, and until these experiments have been made and the time has arrived, it is deemed by your committee very unwise to give broad approval to this method of water purification. Meanwhile, your committee would recommend that the Secretary be instructed to obtain from the state boards of health of other states, their reports on investigations and conclusions with respect to this method of treating polluted water."

"Piqua. Additional Sewerage.

It is recommended that the Chief Engineer's recommendations be approved."

(It was moved by Dr. Grube and seconded by Dr. Hasencamp that the project for constructing a sewer in South Main Street, Piqua, as shown on plat and profile submitted by Mr. T. D. McClay, director of public service, and Mr. D. S. Lindsey, city solicitor, March 30th, 1911, be approved upon the condition that this approval shall become void if the sewer is not constructed before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

"Reading. Sewerage System.

It is recommended that the plan of sewage outfall into the east branch of Mill Creek be approved, with the provision that the plan for the outfall be such as to admit of the addition of a disposal works in the future if such should be found necessary."

(It was moved by Dr. Grube and seconded by Dr. Hasencamp that the plans for a system of sanitary sewers for Reading, prepared by Mr. D. S. Hoshbrook,

village engineer, and submitted March 24th, 1911, with outfall into the east branch of Mill Creek, be approved with the provision that the plan for the outfall be such as to admit of the addition of a disposal works in the future if such should be found necessary.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none).

"Defiance. Water Supply.

This is a request from the local board of health for action against the water company under the Bense law for improvement in the quality of the public water supply. The Engineering Committee deems it unwise to send out further orders under the Bense Act until the constitutionality and scope of this act has been decided by the Supreme Court."

Lakeside Water Purification Plant.

The Engineering Committee recommends that the proprietors of Lakeside, be notified that the orders of the Board must be fully complied with, if the resort is to be opened to visitors this summer; there is evidence that 5,000 people gather at this place at the height of the season, where the daily consumption of water will reach 350,000 to 400,000 gallons and to meet the sanitary conditions the purification works must be planned and built on this basis.

The extension of the sewer outfall and screening of heavier solids from the sewage is essential to the protection of the water intake from local sewage pollution.

This is a popular summer resort and the lives of many people are imperiled by the existing unsanitary condition of the water supply, and as far as it lies in the power of the Board these conditions should be remedied.

Respectfully submitted,

(Signed) JOHN W. HILL,

Engineering Com. State Board of Health."

On motion of Dr. Grube, seconded by Dr. Hasencamp, this report was approved and adopted.

A report on proposed changes in the sewerage system and purification of sewage of the village of New Bremen was presented.

It was moved by Mr. Hill and seconded by Dr. Grube that the general plan, submitted by Mr. A. Elliott Kimberly, consulting engineer, April 18th, 1911, be approved, said plan being:

(a) By intercepting the dry weather flow up to 100,000 gallons per day and treating the same in settling tanks having a total capacity of 50,000 gallons.

(b) By sterilizing the effluent from the settling tanks with hypochlorite of lime.

(c) By diverting from the canal into the ditch, for the purpose of filtering the settled sewage, 3,000,000 gallons of water daily.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

The Secretary was instructed to inform the authorities that before final approval is given of this project, the Board will expect that full

detailed plans for sewerage and sewage disposal improvements together with a description of the proposed method of applying the disinfectant, be submitted to and receive the approval of the State Board of Health.

A report upon sewerage and sewage purification for "Camp Wise," Euclid Village, Cuyahoga, was presented and was, on motion, referred to Mr. Hill for further investigation and report.

The Secretary presented a report on detailed plans submitted April 6th, 1911, required by the third condition of the Board's approval of a general plan for a mechanical filtration plant for Lakeside. (January 25th, 191.)

On motion of Mr. Hill, duly seconded, the President appointed Dr. Hasencamp and the chief engineer a committee to visit Lakeside to determine whether the spirit of the Board's order is being carried out, with power to act.

An amended plan for cesspool and septic tank for the Claire Rest House, Norfolk and Western Railroad, Hamilton County, Ohio, was presented, the same having been submitted by Mr. Charles F. Losh, assistant engineer of the company.

On motion of Mr. Hill, seconded by Dr. Grube, this plan was approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

The Secretary presented his monthly report, which on motion of Mr. Hill was received and filed.

Dr. Grube reported that some dissatisfaction had been expressed by members of the medical profession of Miami and Darke counties in regard to the location of the proposed district hospital for tuberculosis, the site for the hospital having been approved by the Board.

It was suggested that if a written protest could be made to the Board, it would be investigated.

Dr. Grube also reported that the sewage disposal plant for the city of Xenia was in bad condition and accomplishing but little purification of the sewage. He suggested that the plant be investigated.

On motion, the President appointed Dr. Grube and the chief engineer a committee to investigate and report upon this plant.

The Secretary presented a letter from Mr. J. W. Smith, prosecuting attorney for Ottawa County, in regard to the pollution of Jennings Creek by manufacturing wastes and the sewage from Delphos.

On motion of Dr. Grube, this complaint was referred to Mr. Hill and the chief engineer, for investigation and report.

The Secretary presented a complaint in regard to the pollution of Wills Creek, made by the trustees of Cambridge Township, Guernsey County.

On motion of Dr. Grube, this was referred to Dr. Sutton and the chief engineer for investigation and report.

The application of Lida M. Bowers, for license to conduct a maternity boarding house and lying-in-hospital at 2302 Cherry Street, Toledo, was presented.

Dr. Hasencamp stated that this place was located near his residence, and on motion the Chair referred this application to Dr. Hasencamp for further investigation and report.

The Secretary presented a list of health officers, appointed by council to serve in lieu of a board of health, and endorsed by five property holders of their respective villages.

On motion of Mr. Hill, seconded by Dr. Warner, these health officers were approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

On motion of Mr. Hill, seconded by Dr. Warner, it was voted to confirm the appointment of Dr. Henry McCreary as health officer of New Concord.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

The Secretary presented a letter from the superintendent of schools at Circleville, in reference to cases of syphilis among high school pupils.

No action was taken.

The Secretary also presented a letter from Dr. M. E. Reeder of Ohio City, asking whether the Wasserman test would be made by the Board.

No action was taken, but it seemed to be the sense of the meeting that such examination should not be made in the Board's laboratory.

The blank prepared by the chief engineer for annual reports on public water supplies was taken up for consideration.

On motion of Mr. Hill, this matter was referred to the Executive Committee and the Secretary, with power to act.

The Secretary stated that plans for sewage disposal plant for the city of Salem had been approved by the Board in 1906; that it is now proposed to carry out these plans, and the question was whether they should be re-submitted on account of the long time that had elapsed since their general consideration.

It was voted to refer these plans to the Engineering Committee for consideration and report.

The Secretary presented a sketch showing the location of a site proposed for a county hospital for tuberculosis for Defiance County, and reported that he had inspected this site in company with Mr. Shirer, secretary of the board of state charities, who united with him in recommending its approval. The site consists of about 21 acres of land, located about a half mile east of Defiance and bordering upon the Maumee River.

On motion of Mr. Hill, seconded by Dr. Grube, the Board voted to approve this location.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Hill. In the negative, none.

There being no further business, the Board adjourned to meet in Cleveland, Tuesday, May 9th, at 8 p. m.

Attest:

C. O. PROBST, *Secretary*.

Approved May 9th, 1911.

MAY MEETING

1911

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, at 8 p. m., Tuesday, May 9th, 1911.

There were present Drs. Miller, Warner, Hasencamp, Grube and Sutton.

Mr. B. F. Long village solicitor, and Mr. O. S. Earnest, mayor, of the village of Plymouth, Richland County, appeared before the Board and stated that their tax valuation was insufficient to raise the necessary amount of money to carry out the Boards instructions as regards the improvement of their public water supply, and requested the Board to issue an order under the Bense Act requiring that such improvement be made, thus enabling them to raise sufficient funds.

The matter was referred to executive session.

The minutes of the April meeting were read and approved.

Dr. Warner, as chairman of the Finance Committee, presented a list of vouchers showing expenditures made from April 16th to April 30th, 1911; and balances on that date.

On motion, the report was accepted and approved.

As chairman of the Executive Committee, Dr. Warner presented a request from Miss Halderman, correspondence clerk in the engineering department, for a leave of absence from June 1st, 1911, to January 1st, 1912, on account of ill health; Miss Halderman agreeing to furnish a substitute whose work would be satisfactory to the Secretary and the Chief Engineer.

On motion of Dr. Warner, this request was granted.

Continuing his report as chairman of the Executive Committee, Dr. Warner recommended the following changes:

1st. That James Robinson be given the title of messenger and mailing clerk, and that Miss Schofield be given the title of stenographer, with salary of \$55.00 per month.

2nd. That the salary of Miss Dwight be increased \$10.00 per month; and the salary of Leo Ey be increased \$5.00 per month.

3rd. That the salary of Fred Berry be increased \$70.00 per year, and that of J. P. Van Wirt be increased \$110.00 per year; these being contingent upon the Senate passing the general appropriation bill as it passed the House of Representatives.

On motion of Dr. Grube, this report was approved and adopted.

Dr. Miller presented a bill which had been rendered by George Dyer of Lima, for automobile service for Mr. Van Buskirk.

On motion of Dr. Warner, this bill was allowed.

The Board then adjourned to 4 p. m. of the following day.

SECOND SESSION.

WEDNESDAY, MAY 10TH, 1911.

The Board reassembled at 4 p. m., May 10th. Drs. Miller, Warner, Hasencamp, Grube and Sutton being present.

The report of the committee, Dr. Hasencamp and the chief engineer, appointed to investigate the progress of water and sewerage improvements at Lakeside, was presented, recommending that the Board require:

1st. That the water purification plant at Lakeside, constructed in accordance with the plans submitted, be completed before the grounds are opened;

2nd. That a screen chamber be constructed along the line of the main sewer, and that necessary tanks for introducing a disinfectant into the sewage be also installed at such point;

3rd. That an experienced and efficient filter operator and analyst, whose appointment shall first be approved by the State Board of Health, be retained and placed in responsible charge of both the purification of the water and the screening and disinfection of the sewage during the coming season; and,

4th. That The Lakeside Campmeeting Association, before the 1912 season, enlarge the clear water basin to a capacity of 125,000 gallons, and extend the main sewer into the lake as previously directed by the State Board of Health.

It was moved and seconded that this report and recommendation be adopted, and that the committee be continued.

Those voting in the affirmative were Drs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

Complaint having been made of the condition of the sewage disposal plant at Lakewood, it was voted to refer the matter to a committee consisting of the president and the chief engineer for investigation and report.

The Committee, Dr. Hasencamp and the chief engineer, appointed to investigate various sources of pollution of Ten Mile Creek and Sibley Creek, Toledo, presented an informal report which was accepted and the committee continued.

The report on sewerage and sewage purification for Camp Wise, with recommendations of the Engineering Committee, was taken up for consideration.

It was moved by Dr. Hasencamp and seconded by Dr. Grube, to approve the plans submitted April 5th, 1911, by Mr. Charles W. Root, consulting engineer of Cleveland, for sewerage and sewage purification for Camp Wise, located 12 miles east of the Cleveland Public Square, upon the conditions:

1st. That as soon as the work is completed a caretaker be appointed whose duty it shall be to visit the purification works at least once a day and to maintain them in a manner satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and

3rd. That a more satisfactory method of applying the sewage to the surface of the filters be provided.

Those voting in the affirmative were Drs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The Secretary was instructed to call the attention of the consulting engineer to the probable necessity of using a deodorizer if odors should arise from the plant; and also to the desirability of substituting coke properly graded for the sand proposed in the filters, the sizes to be determined by the chief engineer of the State Board of Health.

The committee, Dr. Grube and the chief engineer, appointed to investigate the existing sewage purification plant at Xenia, presented a report, recommending that the city of Xenia be notified that its sewage purification plant, due to poor construction and lack of proper maintenance, is entirely inadequate and should be remodeled, and that the records of the Board show that the plant was not built in accordance with the plans which were presented to and approved by the Board in 1900; and that the city is therefore discharging sewage into the stream without having obtained authorization therefor, as required by law.

On motion of Dr. Hasencamp, seconded by Dr. Sutton, the report and recommendation were approved and adopted.

The Secretary presented his report, which was received and ordered filed.

Matters acted upon by mail were taken up for confirmation by a *viva voce* vote, as follows:

It was moved by Dr. Hasencamp, and seconded by Dr. Sutton, to confirm the action of March 24th, 1911, approving plans for a water purification plant for Niles, as shown on drawings submitted by Messrs. Burgess and Long, consulting engineers, February 20th, 1911, upon the conditions:

1st. That detailed plans of the superstructure, coagulant devices, rate controllers, and such other details as are necessary before the contract is let, be submitted to and receive the approval of the State Board of Health before construction is begun;

2nd. That specifications for the work, which are now being prepared for the purpose of letting the contract, be submitted to and receive the approval of the State Board of Health before the contract is let; and,

3rd. That this approval be void unless construction is begun before July 1st, 1912.

(Blue print showing details of solution tanks and clear well was submitted April 8th, 1911. Secretary.)

Those voting in the affirmative were Drs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

It was moved by Dr. Hasencamp and seconded by Dr. Warner, to confirm the action of April 24th, 1911, approving the Litwiler site (No. 2 location so-called) as a location for public water supply wells for the village of Andover, said site being shown on a drawing submitted by Mr. L. E. Chapin, consulting engineer, on January 11th, 1911, provided:

1st. That detailed plans showing the method of obtaining and storing the water supply before same is delivered to consumers be submitted to and receive the approval of the State Board of Health before the works are placed in operation;

2nd. That no future wells be placed nearer than 100 feet of any boundary of the water supply land, without first submitting the question to the State Board of Health for approval; and

3rd. That approval of this site be void unless construction of the works has been completed before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The Secretary reported that information had been received that the site for the county tuberculosis hospital for Defiance County, previously approved by the Board, had been abandoned because a satisfactory deed could not be given for the property. A new site is to be selected.

The Secretary presented a request from the board of health of Urbana, that the State Board of Health investigate the conditions arising from the improper disposal of sewage in the city of Urbana.

On motion, the matter was referred to a committee consisting of the president and the chief engineer for investigation and report.

The Secretary presented a petition under the Bense Act from the board of health of Columbus, complaining that the municipalities of Marion, Kenton, Prospect, Marysville and Magnetic Springs, located in Marion, Hardin, Delaware and Union counties, are discharging and permitting to be discharged sewage and other wastes into the Scioto River and tributaries, and by reason thereof has polluted said Scioto River which is used as a source of public water supply by the city of Columbus, and asking the State Board of Health to investigate the conditions complained of.

The Secretary was instructed to bring the matter before the Board at its next meeting.

The Secretary presented a communication from F. H. Eggers of

Cleveland, complaining of the condition of Morgan Run from the Cuyahoga River to Broadway, and asking the Board's assistance in securing abatement of the nuisance created.

On motion, the matter was referred to a committee consisting of Dr. Miller and the chief engineer for investigation and report.

The Secretary presented a communication from Dr. C. H. Merz of Sandusky, complaining of the condition of the water filtration plant, and also of the pollution of Mills Creek.

This matter was referred to a committee consisting of Dr. Hasencamp and the chief engineer for investigation and report.

The application of Mrs. Fillipine Kratz to conduct a maternity boarding house and lying-in hospital at 339 East Market Street, Akron, Ohio, was presented.

It was moved by Dr. Warner and seconded by Dr. Hasencamp to grant this license.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The application of Mrs. Minnie Knapp to conduct a maternity boarding house and lying-in hospital at 2423 West 11th Street, Cleveland, was presented.

It was moved by Dr. Warner and seconded by Dr. Hasencamp to grant this license.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

Dr. Hasencamp, to whom was referred the granting of a license to Mrs. Lida Bowers to conduct a maternity boarding house and lying-in hospital at 2302 Cherry Street, Toledo, recommended that this license be granted but that Mrs. Bowers be required to furnish a plan of the second floor of her dwelling.

On motion, it was voted to grant this license, those voting in the affirmative being Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The Secretary presented a letter from Dr. H. C. Eyman, superintendent of the Massillon State Hospital, in regard to permitting persons suffering from a contagious or infectious disease to be sent to a state institution.

No action was taken.

The Secretary presented a list of health officers, appointed by their respective councils to serve in lieu of a board of health.

On motion of Dr. Warner, seconded by Dr. Hasencamp, these health officers were approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The Secretary presented a set of rules and regulations adopted by Porter Watson, serving as health officer of Lowellville, in lieu of a board of health.

On motion, these were referred to Dr. Warner and the Secretary with power to act.

The Secretary presented plans for a tuberculosis hospital for Lorain County, prepared by H. O. Wurmser, architect of Lorain.

On motion of Dr. Warner, seconded by Dr. Grube, these plans were approved subject to the changes mentioned in a communication from the Secretary to the architect under date of April 18th, 1911, provided plans showing such changes are filed with the Board within a reasonable time.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube and Sutton.

In the negative, none.

The question of the complaint against the water supply of Plymouth was taken up. An opportunity having been given the village to be heard, and the village filing no valid evidence, protest or remonstrance against the action or findings heretofore made, it was moved by Dr. Warner and seconded by Dr. Hasencamp that the report of the Board's committee and the recommendations therein contained be now approved and confirmed.

The roll call resulted as follows: Yeas, Drs. Miller, Warner, Hasencamp, Grube and Sutton. Nays, none.

It was thereupon moved by Dr. Warner and seconded by Dr. Hasencamp that the improvements or changes recommended in said report be and the same are hereby declared to be necessary and should be made; to-wit: That the village of Plymouth be required to purify the present water supply or secure a new water supply, satisfactory to the State Board of Health, within a period of six months from the date of the approval of the Board's order by the Governor and the Attorney General.

The roll call upon the adoption of this motion resulted in Yeas, Messrs. Miller, Warner, Hasencamp, Grube and Sutton. Nays, none.

Thereupon, it was moved by Dr. Warner, and seconded by Dr. Hasencamp that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted in Yeas, Messrs. Miller, Warner, Hasencamp, Grube and Sutton. Nays, none.

The Board then adjourned to meet in Columbus at 8 p. m., Thursday, June 1st, 1911.

Attest:

C. O. PROBST, *Secretary*.

Approved July 10th, 1911.

JUNE MEETING

1911

A regular meeting of the State Board of Health was held at the office of the Secretary, in Columbus, June 1st, 1911, at 8 p. m.

There were present Drs. Warner, Hasencamp, Grube and Sutton, Mr. Hartzell and Mr. Hill.

The first matter taken up was the election of officers for the ensuing year, to be installed at the regular meeting of the Board in October, 1911.

Mr. Hill nominated Dr. Frank Warner of Columbus for President. There was no other nomination.

On motion, the Secretary was instructed to cast the ballot for the election of Dr. Warner as President for the ensuing year, which he did, and Dr. Warner was declared elected.

Dr. Oscar Hasencamp of Toledo was nominated for Vice-President.

On motion, the Secretary was instructed to cast the ballot for the election of Dr. Hasencamp as Vice-President for the ensuing year, which he did, and Dr. Hasencamp was declared elected.

Mr. Hill moved that, in accordance with an opinion of the Attorney General, Dr. C. O. Probst be elected Secretary for the ensuing year.

This motion was seconded and carried.

Prof. F. H. Eno, consulting engineer, and a delegation of four gentlemen from Cambridge, appeared before the Board in regard to a new water supply for that city. They asked the Board to approve of Wills Creek as the source of supply.

This matter was referred to executive session.

The Secretary stated that Mr. H. J. Luff of Cleveland desired to appear before the Board in regard to having the Board add an *addenda* to Part 4, known as the sanitary code, of the State Building Code recently enacted by legislature.

On motion of Dr. Grube, it was voted to refer this matter to the Secretary and the state inspector of plumbing for consideration and report at the next meeting.

Dr. Warner, as chairman of the Finance Committee, presented a list of vouchers showing expenditures made from May 1st to May 31st, 1911; and balances to date.

On motion of Dr. Hasencamp the report was adopted and ordered filed.

As chairman of the Executive Committee, Dr. Warner reported:

(a) That he had authorized the employment of a boy helper in the laboratory for a period of two weeks, to be paid at the rate of \$30 per month.

(b) That it was recommended that Dr. Grube be appointed a special committee to consider occupational diseases, in accordance with a recent act of Legislature, and that he be authorized to visit such places as he might deem necessary.

(c) That he had selected Dr. Frank G. Boudreau, formerly of Montreal and now pathologist of The Charity Hospital of Cleveland, as epidemiologist, and recommended that he be employed as such, to begin with a salary of \$1,500 per year.

On motion of Dr. Grube, Dr. Warner was authorized to employ Dr. Boudreau as epidemiologist, at a salary of \$1,500 per year.

On motion of Dr. Sutton, it was voted to approve the recommendation that Dr. Grube be made a committee on occupational diseases with authority to visit such places as he might deem necessary.

On motion of Dr. Sutton, the report of the Executive Committee was approved.

Mr. Hill, as Engineering Committee, submitted his report which, on motion of Dr. Sutton, was adopted.

The various questions reported upon by the Engineering Committee were taken up in the following order:

The plans for a sewage purification plant for Kennedy Heights, as shown on drawings and described in specifications submitted by Mr. J. A. Stewart of Cincinnati, consulting engineer, March 30th, 1911.

It was moved by Dr. Grube and seconded by Dr. Sutton that these plans be approved upon the following conditions:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2d. That detailed plans of all automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed; and,

3d. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The public water supply of Fredericksburg, which is derived from a drilled well located near the center of the village as shown on sketch-plan submitted April 8th, 1911, was considered.

It was moved by Mr. Hartzell and seconded by Dr. Sutton, that this public water supply be approved upon the following conditions:

1st. That no more wells be drilled without first notifying the State Board of Health and obtaining its approval thereof; and,

2d. That the village enact an ordinance requiring all privy vaults within 300 feet of the public water supply well to be made watertight, and that all vaults and barnyards within this distance be regularly inspected by the health officer and required to be kept in a sanitary condition.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Board then considered the plans and specifications covering the additional concrete work, controlling devices, machinery, and laboratory building, which are necessary to complete the existing water purification plant at Bellaire, the plans being those submitted by Mr. L. E. Chapin, consulting engineer, on May 22d, 1911.

It was moved by Dr. Sutton and seconded by Dr. Hasencamp to approve these plans upon the following conditions:

1st. That the filtering material now in the filters be removed, screened, and properly replaced;

2nd. That when completed, the filtration plant be placed in charge of a trained operator and analyst, whose appointment shall first be approved by the State Board of Health; and,

3rd. That detailed plans of whatever rate controller is finally chosen, be submitted to the State Board of Health for approval before the controllers are placed.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The plans submitted by Mr. Forest Anders, clerk of the department of public service, on May 13th, 1911, for proposed sewers for North Street, Temple Street, and Green Street, respectively, Washington C. H., were considered.

On motion of Dr. Grube, seconded by Dr. Sutton, it was voted to disapprove these plans, and to advise the city that immediate steps should be taken toward the installation of a general sewerage system and sewage purification works, in some such manner as was proposed by the present city engineer and approved by the State Board of Health in 1902; that the plans submitted at that time could doubtless be improved and made to conform with more modern standards, and for this reason they should be resubmitted to the State Board of Health for consideration, or new plans should be prepared.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The question of approving the plans for a sewage purification plant for Salem was taken up.

It was moved by Mr. Hartzell and seconded by Dr. Grube that the plans for a sewage purification plant for Salem, as shown on the original approved drawings submitted in 1906 and as modified in accordance with the communication received from Mr. L. E. Chapin, consulting engineer, May 23rd, 1911, and in accordance with the revised drawings submitted May 26th, 1911, be approved upon the following conditions:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

2nd. That the entire area of the filters, as shown on plans, be constructed before the plant is placed in service:

3rd. That the city place a competent man in charge of operating the plant;

4th. That the banks surrounding the filters be sodded immediately after they are constructed and before the filtering material is placed; and the dosing pond banks be suitably paved; and,

5th. That this approval be void unless construction of the plant is commenced before July 1st, 1912.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Board then considered the plan, submitted May 15th, 1911, by Mr. Wm. J. Mead, attorney for the village, for a proposed storm water sewer for Gibsonburg (with the understanding that this sewer is to receive storm water only).

It was moved by Dr. Hasensamp and seconded by Dr. Sutton that this plan be approved upon the following conditions:

1st. That the ditch at the proposed outlet be thoroughly cleaned; and,

2nd. That council pass an ordinance prohibiting the use of this proposed sewer for cesspool overflows, cellar drainage, sink wastes, or domestic sewage of any kind; and that a certified copy of this ordinance be filed with the State Board of Health before construction of the sewer is commenced.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Board then considered the plans for proposed sewage purification for New Bremen.

It was moved by Dr. Grube and seconded by Dr. Sutton that the Board approve the detailed plans of settling tanks and sterilization apparatus for New Bremen, as shown on drawings submitted by Mr. A. Elliott Kimberly, consulting engineer, May 22nd, 1911 (said plans being submitted in conformity with the approval of April 21st, 1911, governing the general method of treating the sewage of the village) upon the following conditions:

1st. That the plant be operated at all times in a manner satisfactory to the State Board of Health;

2nd. That during the first thirty days of the operation of the sewage purification plant, the consulting engineer be placed in full charge of same and that he submit a report to the Secretary of the State Board of Health. This report to show the necessary amounts of hypochlorites which are required to treat the sewage under various conditions, the time required for the action of the chemicals, and such other details as are necessary to show conclusively that the process will be satisfactory under local conditions;

3rd. That the village keep daily records, according to a form to be approved by the State Board of Health, governing all features relating to the operation of the plant and to the application of the chemicals, and that such records be submitted weekly to the Secretary of the State Board of Health;

4th. That whenever conditions warrant the addition of a pumping plant and filters to the proposed installation, such addition be made; and,

5th. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Board then took up the question of approving the use of Wills Creek as a source of water supply for the city of Cambridge, and on motion of Dr. Sutton, seconded by Dr. Grube, it was decided that before approving the use of this creek the city of Cambridge be requested to present to the Board in writing such data and estimates as have been obtained in regard to the development of other possible sources of supply, in order that the Board may be assured that whichever plan is carried out is in accordance with the city's best interests.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The question of an additional water supply for Oxford was taken up, and on motion of Dr. Sutton, seconded by Dr. Grube, it was voted to withhold approval of the additional water supply at Oxford until the drainage from the residence of Mr. L. N. Bonham is rearranged so as to avoid any possibility of contaminating the wells; and until the shallow swale near well No. 5 is suitably filled in.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Secretary was instructed to notify the authorities that another inspection would be made when these improvements have been made, and the matter presented to the State Board of Health for definite action.

A report of the special committee on Lakeside (Dr. Hasencamp and the chief engineer) was presented in which it was stated that the secretary of the Lakeside Campmeeting Association had expressed himself as willing to comply with the Board's requirements but as yet he had been unable to find an experienced filter operator. The committee therefore suggested that as the operator must be chosen and approved before the next meeting of the Board, the authority to make such approval be delegated to some officer or committee of the Board.

On motion of Mr. Hill, seconded by Dr. Sutton, the report was adopted and the committee continued with power to act.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Secretary was instructed to request the secretary of The Lakeside Campmeeting Association to inform the Board just what the present conditions are as regards the installation of their water purification plant, and when they expect it to be completed.

The report of the special committee, Dr. Hasencamp and the chief engineer, appointed to investigate the water purification plant at Sandusky was presented.

On motion of Mr. Hill, seconded by Dr. Sutton, the Secretary was instructed to notify the authorities at Sandusky that in view of the present as well as former inspections of the construction of the Sandusky filtration plant the Board is of the opinion that the only safe and sure means of providing pure water to the city of Sandusky would be to build a clear water well entirely separate from the present plant, thus making it impossible for unpurified water to leak into it; and in addition, one or two more filter units should be installed in order to insure satisfactory purification of the water even at times of excessive consumption and when one of the existing units is out of service. Also to call the attention of the authorities to the necessity of keeping in charge of the plant a man thoroughly practiced in filter supervision as well as in the making of necessary analyses, chemical and bacterial, for determining at all times the degree of purification.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

A report was presented from the committee, Dr. Miller and the chief engineer, to whom was referred the complaint of the condition of Morgan Run from the Cuyahoga River to Broadway, in the city of Cleveland, in which it was stated that the only remedy for existing conditions would be the building of an intercepting sewer in the valley of Morgan Run, connecting the same with the main Cleveland interceptor.

On motion of Mr. Hill, seconded by Dr. Sutton, the report was adopted and the secretary was instructed to call the attention of the

mayor and council and the board of health of the city of Cleveland to the desirability of providing proper sewerage for the Morgan Run district as soon as possible.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Secretary presented his report, which, on motion of Dr. Hasencamp, seconded by Mr. Hartzell, was received and ordered filed.

The Secretary presented a petition from the board of health of Columbus, requesting the Board to investigate the conditions of the Scioto River and tributaries, which it is alleged are being polluted by sewage and other wastes from the municipalities of Marion, Kenton, Prospect, Marysville and Magnetic Springs.

This matter was referred to the chief engineer, Mr. Pratt, for investigation and report.

The Secretary presented a petition from the clerk of Center Township, Williams County, O. C. Stauffer of Bryan, asking the Board to investigate the condition of a stream in the township, which it is alleged is being polluted by sewage and other wastes from the Bryan Fertilizer Factory.

This matter was referred to Dr. Hasencamp for investigation and report.

The Secretary presented a petition from the clerk of Clinton Township, Fulton County, Mr. Geo. E. Gorsuch of Wauseon, asking the Board to investigate the condition of Turkey Foot Creek, alleged to be polluted by sewage and other wastes from the village of Wauseon.

This matter was presented to Dr. Hasencamp for investigation and report.

The Secretary presented a petition from the clerk of York Township, Fulton County, Geo. A. Everett of Delta, asking the Board to investigate the condition of Turkey Foot Creek, which it is alleged is being polluted by sewage and other wastes from The Van Camp Packing Company and the village of Wauseon.

This matter was referred to Dr. Hasencamp for investigation and report.

The Secretary presented letters from the secretaries of state boards of health in regard to the use of hypochlorites in the purification of water supplies in their respective states.

Mr. Hill requested that a digest be made of these letters and sent to the members of the Board.

The Secretary presented a list of health officers who had been appointed by their respective councils to serve in lieu of the board of health.

It was moved by Mr. Hill and seconded by Dr. Sutton that these health officers be approved.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Secretary presented a sanitary code adopted by the health officer of East Palestine, Dr. J. M. Van Fossan, serving in lieu of a board of health.

On motion of Mr. Hill, seconded by Dr. Grube, the sanitary code of Dr. Van Fossan as amended was approved.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Hartzell, Hill and Sutton.

In the negative, none.

The Secretary stated that Dr. Warner and he, as a committee with power to act, had on May 17th, approved the rules and regulations adopted by Mr. Porter Watson of Lowellville, serving in lieu of a board of health.

On motion of Dr. Grube, seconded by Dr. Sutton, this action was confirmed, those voting in the affirmative being Drs. Warner, Hasencamp and Grube, Mr. Hill and Mr. Hartzell.

In the negative, none.

The Secretary presented correspondence with Dr. D. H. Darrah, a druggist of Bellaire, relative to furnishing him with containers for sending specimens of sputum to the Board's laboratory.

On motion of Mr. Hill, seconded by Dr. Sutton, it was voted that this request be refused, with regret, on account of insufficient funds to establish an additional station in Bellaire.

A communication from the state inspector of plumbing, Mr. Groeninger, was read by the Secretary, in which he stated that he was now ready, if it should meet with the approval of the Board, to inspect and report upon the sanitary condition of the state and county institutions outside the jurisdiction of the city plumbing inspectors.

On motion of Mr. Hill, it was voted to adopt this suggestion and that such inspection be made under the direction of the Secretary.

The Board then adjourned.

Attest:

C. O. PROBST, *Secretary*.

Approved July 19th, 1912.

JULY MEETING

1911

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, July 19th, 1911, at 8 P. M.

There were present Messrs Miller, Warner, Sutton, Hartzell, Grube and Hill.

Mr. J. C. Martin, manager of The Wilmington Water and Light Company, appeared before the Board in regard to protests against plans for increasing the water supply of Wilmington.

Mr. Hill requested that his letter to the Secretary in regard to this matter be read. The letter was as follows:

"JULY 12, 1911.

DR. C. O. PROBST, *Columbus, O.*

MY DEAR DOCTOR: — Concerning the complaints made by the health officer and others, about the source of water supply for Wilmington: I have gone over our file in this matter, also discussed the subject with Congressman Alfred G. Allen, who is a former resident of Wilmington, and as I understand the situation, the wells have been driven into the rock about 200 feet below ground level, in and along a running or natural water course, the name of which I do not know, and it is probably used for the discharge of cesspools; while none of this objectionable matter may enter the wells at their great depth in the rock, I presume the sentiment of the community is against taking water from wells so located, and to avoid the complaints that have been made, by the health officer and others, I think it would be well to ask Mr. J. C. Martin, the president of the water company, to submit a statement to the Board showing (if he is willing to do so) the amount of money invested in the works, the income derived from the city and its inhabitants, and his estimate of cost of locating the wells at some other point, where this sentimental objection to the location of the wells would be overcome.

If the income from the works is such as to make it financially embarrassing to make the change, then we will be able to state in behalf of the water company, that while there is a sentimental objection to the present location of the wells, there is no real sanitary objection, as shown by analyses, and the typhoid fever rates of the town, to the water supplied, and that it would impose an unnecessary financial burden on the company to demand the change at the present time.

If upon the other hand, the change can be made and come well within the financial resources of the company, then it would seem to me that the company owes it to the people of Wilmington to bow to this sentiment, and locate the wells at a point where the present objection would be wholly avoided.

Very truly yours,

JOHN W. HILL,
Member of the Board."

Mr. Martin stated that he would be glad to give the information requested, if it would be considered confidential.

Mr. Hill moved that the matter be disposed of by furnishing Mr. Martin a copy of this letter. The motion was carried.

Mr. B. F. Hewit, consulting engineer, and W. W. Woodbury, solicitor, appeared before the Board in regard to an additional water supply for the village of Jefferson.

Mr. John Jones, director of public service, Mr. George D. Selby, Mr. Geo. E. Kricker and Mr. George M. Appel, members of the water commission of Portsmouth, appeared before the Board and requested approval of a general plan prepared by Samuel M. Gray, consulting engineer, of an infiltration system for obtaining a new public water supply for that city from Tygart Bar in the Ohio River. If the Board was not prepared to approve the plan they asked that a committee be appointed to make further investigation before official action was taken.

In compliance with this request, a committee consisting of Dr. Warner, Mr. Hill and the chief engineer, Mr. Pratt, was appointed to make further investigation and report.

Mr. H. W. Davis of Youngstown, appeared before the Board in regard to sewage disposal for Pleasant Grove, a suburb of Youngstown.

On motion of Mr. Hill, Mr. Davis was requested to cause to be prepared for consideration at the August meeting of the Board plans for a sewer system and suitable purification works for Pleasant Grove.

Mr. I. H. Ellsworth, member of the board of trustees of public affairs of Oak Harbor, appeared before the Board relative to securing approval of a site for water works purposes, said site being located on a large lot, about 300 by 500 feet in the center of the village, and upon which it is proposed to construct a school building.

Mr. H. J. Luff of Cleveland, and Wm. S. Voris of Akron, appeared before the Board in regard to a request made to the Board to adopt certain addenda to the sanitary division of the State Building Code, recently adopted by legislature.

The Secretary stated that this matter had been referred to him and Mr. Groeninger, the state inspector of plumbing, and that the various items contained in this request had been carefully gone over by Mr. Groeninger, assisted by Mr. F. W. Elliott, architect for the commission that prepared the Building Code.

The report of the committee was submitted. As the report of this committee took up in detail each item contained in the original letter from Mr. Luff, the Board decided that it would be impossible for it, for lack of time, to properly consider the report, or hear additional reasons for the adoption of the proposed addenda, at that time, as requested by Mr. Luff, and the matter was disposed of by a motion of Mr. Hill, which carried, that the committee be continued and that an opportunity be given Mr. Luff, and others who so desired, to present additional information and take up the matter with the committee. The Secretary was instructed

to notify the city officials whose names were attached to the request for the Board's adoption of proposed addenda.

The Board then went into executive session.

The question of water supply for Oak Harbor was taken up and on motion of Mr. Hill, it was voted to refer the matter back to the board of trustees of public affairs and request that a new site for wells be selected which will be removed from all possible sources of pollution.

The Secretary stated that Mr. Charles P. Hoover, assistant chemist at the Columbus water purification plant, had obtained a two months leave in order to accept the position as manager of the Lakeside plant; that Mr. Hoover was personally known by the chief engineer, who believed him to be entirely competent to undertake the management of the Lakeside plant and to overcome such defects as may develop in same, and that the residents of Lakeside will be served with a safe and satisfactory water during the coming season.

The minutes of the May and June meeting were read and, on motion of Mr. Hill, approved.

Dr. Warner, as chairman of the Finance Committee, presented a list of vouchers showing expenditures made from June 1st to July 15th, 1911; and balances to date.

On motion of Mr. Hill the report was adopted and ordered filed.

As chairman of the Executive Committee, Dr. Warner reported:

(a) That Dr. F. G. Bourdeau was placed on duty as epidemiologist, July 1st, 1911, at a salary of \$1500 per year, as directed by former action of the Board.

(b) That R. T. Kennedy was appointed assistant chemist to succeed J. P. Van Wirt, resigned, at a salary of \$60. per month.

(c) That following the request of the Board to the Legislature for an increased appropriation for the purpose, the following changes had been made in salaries:

Fred Berry, assistant bacteriologist, increased from \$1380. to \$1450 per year.

J. P. Van Wirt, assistant chemist, increased from \$720. to \$830. per year.

C. K. Weiman, laboratory helper, increased from \$30. per month to \$40. per month.

These increases taking effect July 1st, 1911.

On motion of Dr. Grube, this report was approved.

The report of the Engineering Committee was then presented and the questions involved were taken up in the following order:

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the plans for enlarging the Lorain water purification plant, as shown on drawings submitted by Wm. E. Knight, director of public service, June 29th 1911, upon the following conditions:

1st. That if the device for applying the coagulant in dry form, or any other part of the apparatus, should prove unsatisfactory when put in use, the State Board of Health will require that such changes be made as may be necessary to comply with standard practice in mechanical filtration; and,

2nd. That this approval shall be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Sutton to approve the plans for rate controllers, for use in the Bellaire filtration plant, as shown on the drawings and described in the specifications of the American Water Softener Company, and submitted by L. E. Chapin, consulting engineer, on June 19th, 1911, provided, that each controller, after installation, be so adjusted, by actual test, that its maximum rate of discharge will not exceed 690,000 gallons per twenty-four hours (corresponding to a rate of filtration of 125,000,000 gallons per acre per day); and that the adjusting device be then permanently fixed so that this rate cannot be exceeded.

Also, that it be understood that this adjustment shall be made to the satisfaction of a representative of the State Board of Health.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

It was moved by Dr. Sutton and seconded by Mr. Hartzell to approve the plans for a storm water sewer for the southeastern portion of Sandusky, as shown on drawings submitted by C. M. King, city engineer, on June 16th, 1911, upon the following conditions:

1st. That before constructing the sewer, council pass an ordinance prohibiting the use of this sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and,

2nd. That this approval be void unless construction is commenced before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Grube to approve the plans for sewerage and sewage purification for the village of Shreve, as shown on drawings submitted by L. E. Chapin, consulting engineer, on June 5th, 1911, provided:

1st. That the sewage purification plant be completed in a satisfactory manner before any of the proposed sewers are placed in use;

2d. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed;

3d. That the area of sand filters, for present installation, be increased by including therein the third filter shown on the plans, but intended by the designer for future construction;

4th. That more filter units be added whenever the number of persons contributing sewage to the plant reaches 600;

5th. That the thickness of the filtering sand, exclusive of the gravel, be not less than three feet at any point;

6th. That all slopes of the embankments surrounding the filters be suitably sodded either before, or immediately after, the placing of the sand;

7th. That the village council provide, before the plant is placed in use, for the appointment of a competent superintendent of sewers, who shall keep records of all sewer connections and who shall operate the purification plant in a manner satisfactory to the State Board of Health; and,

8th. That this approval be void unless the plant is constructed on or before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve as an additional source of water supply until July 1st, 1913, the 8-inch well located on the grounds of the Chestnut Street School, Lisbon, provided:

1st. That no new well be located on this site without first receiving the approval of the State Board of Health;

2d. That all abandoned gas wells within 300 feet of the well be filled with concrete, and that the State Board of Health be notified that this requirement has been fulfilled by the board of trustees of public affairs:

3d. That all privy vaults within 300 feet of the well be made and maintained water-tight, and that council file with the State Board of Health a copy of the ordinance requiring that this be done; and,

4th. That the top of the proposed well be protected from the entrance of any surface water.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The Secretary was instructed to notify the officials at Lisbon that the Board would urge that they take up the question of improved water supply on a broader basis with the idea of going outside the village, if necessary, and obtaining a suitable and permanent supply.

It was moved by Mr. Hartzell and seconded by Dr. Sutton to approve the plans for a storm water sewer in Smith Street, Miamisburg, as shown on drawings submitted by Mr. George W. Riley, engineer for the village, on June 19th, 1911, upon the following conditions:

1st. That before constructing the sewer, council pass and provide for the enforcement of an ordinance prohibiting the use of this sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and,

2d. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The Secretary was instructed to call the attention of the authorities at Miamisburg to the fact that the Board, realizing the dangers arising from the use of storm water sewers for sanitary purposes, would emphasize the importance of carefully looking after the enforcement of their ordinance to prevent the use of storm sewers for sanitary purposes.

It was moved by Mr. Hartzell and seconded by Dr. Sutton to approve the plans for a storm water sewer for West Lafayette, as shown on drawings submitted by R. E. Hamilton, consulting engineer, on May 27th, 1911, upon the following conditions:

1st. That before constructing the sewer, council pass and provide for the enforcement of an ordinance prohibiting the use of this sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and,

2d. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hartzell, Sutton, Grube and Hill.

In the negative, none.

The Secretary was instructed to call their attention to the dangers arising from the use of storm water sewers for sanitary purposes, and urge the strict enforcement of the above mentioned ordinance.

It was moved by Dr. Grube and seconded by Mr. Hartzell to approve the plans for securing a water supply for New London by means of an impounding reservoir, as shown on a drawing prepared by The Riggs and Sherman Company, consulting engineers, submitted in 1904 and resubmitted on June 5th, 1911, upon the following conditions:

1st. That full detailed plans for a filtration plant be submitted to and receive the approval of the State Board of Health before the proposed work is begun;

2d. That the water impounded in accordance with this project be first filtered in a manner satisfactory to the State Board of Health before being delivered to consumers; and

3d. That the plans for dam and reservoir as prepared and approved in 1904 be not changed or amended in any way without first obtaining the approval of the State Board of Health.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The Secretary was instructed to call the attention of the board of trustees of public affairs of New London to the fact that it has been the frequent experience that impounding reservoirs on small watersheds have not fulfilled what was expected of them in the way of providing sufficient water, and that it would be better, therefore, if a larger watershed could be obtained.

It was moved by Mr. Hartzell and seconded by Dr. Sutton to approve the public water supply of Utica, as shown on plans and specifications submitted by Samuel S. Wyer, consulting engineer, on August 23d, 1910, which plans have in effect already been carried out; and to advise the board of trustees of public affairs to install the drains and overflow in the reservoir which were recommended to that Board under date of November 19th, 1910.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the site shown on plan prepared by Mr. L. E. Chapin, consulting engineer, and submitted on July 19th, 1911, for water works purposes for the village of Sugar Creek provided:

1st. That the State Board of Health be notified when any new wells are to be sunk; and,

2d. That this approval be void unless the wells are placed in use before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The report on proposed water supply for the village of Bremen, as shown on drawings submitted by E. G. Bradbury, consulting engineer, on July 7th, 1911, was considered and on motion of Dr. Grube, seconded by Dr. Sutton, the matter was referred back to the chief engineer for further information in regard to the gravel formation in which the water is found and the subsoil drainage.

The question of increasing the water supply of Jefferson in accordance with a plan submitted by B. F. Hewitt, consulting engineer, July 10th, 1911, was considered and on motion of Dr. Grube was referred back to the consulting engineer for further report.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve the plans for a new sewerage system, intercepting sewer and purifica-

tion works for Washington C. H., as shown on drawings submitted by Frank M. Kennedy, city engineer, July 10th, 1911, upon the following conditions:

1st. That before any contracts for construction are let detailed designs of the overflow to be used at the connections between the existing combined sewers and the new interceptor be submitted to and receive the approval of the State Board of Health;

2d. That before any contracts for construction are let detailed plans of the pumping station and purification works, including the plans for controlling devices, be submitted to and receive the approval of the State Board of Health;

3d. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

A condensed statement relative to the pollution of Jennings Creek at Delphos, prepared by the chief engineer, was presented by Mr. Hill with the following recommendation:

"The conclusions of the chief engineer of the Board are endorsed by the engineering committee with the further suggestion that the citizens of Jennings Township who have petitioned the Governor for relief, be advised by the Secretary of the Board to file an action in the Common Pleas Court of Allen County against the village of Delphos, petitioning the village to abate the cause of complaint, all of which originates within the jurisdiction of the village.

"It seems to your committee that the Board has exhausted its powers in this matter, and as it has a commercial as well as aesthetic and sanitary sides, it seems that it could properly be relegated to the courts to determine the matter and incidentally define the powers of the Board with reference to complaints of this nature, when the damage is more of an æsthetic than sanitary character."

It was moved by Mr. Hartzell and seconded by Dr. Sutton to adopt the above recommendation.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube.

In the negative, none.

It was then moved by Dr. Sutton and seconded by Dr. Grube that the report of the engineering committee as a whole be adopted.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell and Grube.

In the negative, none.

Dr. Grube referred to the condition of the sewage purification plant at Xenia, and, on motion, the report of the special committee with reference to this matter and correspondence, were referred to the engineering committee.

The Secretary presented his monthly report which was received and ordered filed for publication.

Dr. Grube stated that the Legislature, in passing the act requiring the State Board of Health to investigate occupational diseases had failed to make a special appropriation for the work. He asked permission to purchase such books and reports as he might need, as the committee appointed to look into this matter.

On motion of Mr. Hill, Dr. Grube was requested to prepare a requisition for such books, reports, etc., needed and submit it to the chairman of the Executive Committee.

The Secretary presented a request from the Swan Creek Lumber and Supply Company of Toledo, asking the Board's permission to connect a water closet with an established storm water drain.

For want of time, no action was taken in this matter.

The Secretary presented a letter from Messrs. Snook and Savage, attorneys-at-law at Paulding, enclosing affidavit of H. S. Robinson, asking the Board to look into the matter of the pollution of an open ditch in Oakwood, Paulding County, by the refuse from manufacturing and industrial plants in that village.

For want of time, no action was taken.

The Secretary presented a communication from W. R. Copeland, chief chemist at the water purification works in Columbus, relative to the prevalence of cholera in Italy and New York and the fact that a number of camps along the Scioto River are composed of Italian laborers, and asking the Board to look into the matter of proper vaults being maintained for the use of the laborers in these camps.

No action was taken.

The Secretary presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve these health officers.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The Secretary presented the following applications for a renewal of license to conduct a maternity boarding house and lying-in hospital; all having been approved by the local authorities:

Mrs. Ella Hastings, 928 Miller Avenue, Columbus.

Florence Crittenton Home, 1166 East Main Street, Columbus.

Dr. F. A. Kautz, 2839 Clifton Avenue, Cincinnati.

It was moved by Mr. Hill and seconded by Dr. Grube to grant the renewal of these licenses.

Those voting in the affirmative were Messrs. Miller, Warner, Sutton, Hartzell, Grube and Hill.

In the negative, none.

The Secretary presented a communication from Dr. J. W. Scherechewsky, of the U. S. P. H. and M. H. S., and director of the Exhibition, calling attention to the XV International Congress on Hygiene and Demography to be held in Washington, D. C., September 23-28, 1912, and asking the various states to participate in the exhibit.

The matter was referred to the Executive Committee.

The Secretary presented rules and regulations adopted by W. C. Sharp, health officer serving in lieu of a board of health for the village of Leesville, Carroll County.

These were referred to the Secretary, with power to act.

The Secretary presented the sections of the new State Building Code relative to the approval of the Board and the construction of cesspools.

This matter was referred to the Engineering Committee.

The Secretary presented a report of the state inspector of plumbing upon his examination of certain public institutions, and recommendations for changes in the plumbing of these institutions.

On motion of Mr. Hill, this report was referred to the Engineering Committee.

The Secretary presented a report prepared by the engineering department of a study of the collection and disposal of city wastes in Ohio.

On motion of Mr. Hill, this was referred to the Engineering Committee.

On motion of Mr. Hill, it was decided to hold the next meeting of the Board at Cedar Point on the second Thursday in August. (August 10th, 1911.)

The Board then adjourned.

Attest:

C. O. PROBST, *Secretary*.

Approved August 10, 1911.

AUGUST MEETING

1911

*A regular meeting of the State Board of Health was held at the Hotel Secor, Toledo, Ohio, on August 10th, 1911, at 8 P. M.

There were present Drs. Miller, Warner, Hasencamp, Grube, Mr. Hartzell, and Mr. Hill.

Mr. P. D. Turner, member of council, addressed the Board in regard to proposed water supply for Bremen.

A delegation from Oak Harbor was present and Mr. I. H. Ellsworth, president of the board of trustees of public affairs and Secretary of State Graves, a member of the board of health, of Oak Harbor, urged approval of a site in the center of the village, bounded by Center, Church, Walnut and Park streets, for a new public water supply.

Mr. J. C. Poling, consulting engineer for the village of Ada, appeared before the Board in regard to securing approval of a county sewer outlet, or covered ditch.

On motion of Mr. Hill, this was referred to the engineering department for investigation and report.

A large delegation of citizens from West Toledo appeared before the Board in regard to the pollution of Ten Mile Creek and Swan Creek.

On motion of Mr. Hill this matter was referred to Mr. Pratt, the chief engineer, with Dr. Hasencamp, for investigation and report.

Mr. H. J. Luff, of Cleveland, appeared before the Board in regard to his request for the Board's approval of certain addenda to the State Building Code. The Secretary, as chairman of the committee to which this matter had been referred at a previous meeting, stated that he had taken the question up with the Attorney General as to the authority of the Board to approve the addenda, as requested by Mr. Luff, and the Attorney General had ruled that the Board had no such authority.

Mr. Luff, the Secretary stated, had then made his request in another form, asking that the Board make an interpretation of certain features of the building code, and that this matter had been gone over with the state inspector of plumbing, Mr. Groeniger, and a report formulated which the Secretary thereupon presented.

Mr. Luff was given an opportunity to speak briefly to the question and on motion of Dr. Warner, it was voted to refer it back to the committee with instructions that the committee fix a time when Mr. Luff

*Place of meeting changed by Executive Committee from Cedar Point to Toledo.

and others interested might present anything additional to what had already been presented in regard to this matter.

Mr. Joseph McMahon, building inspector of Toledo, was present and stated that he had been informed that the Board would not allow the use of a resealing trap. He wished to state that they used a trap in Toledo and proposed to continue its use.

Mr. Wm. Gould of Toledo appeared before the Board and stated that some time previous, to-wit: at a meeting held March 18th, 1911, the Board had declared that a main sewer, for sanitary purposes, was necessary in the district lying on the westerly side of the Maumee River from the southerly corporation line of the city of Toledo to a point at least one and one-half (1 and 1-2) miles upstream from the city water works intake, said district being described in detail in the report presented by the Board's committee that made the investigation.

Mr. Gould further stated that since that time the Legislature had passed a new act governing such sewers (sewers outside of municipalities) and requested that the Board take further action in declaring this sewer, with a disposal or purification plant, necessary.

On motion of Dr. Warner, seconded by Dr. Grube, the Board voted to declare necessary a sewer, in approximately the same district as that acted upon at its meeting held March 18th, 1911, and which may be described as follows:

"Beginning at the point where the north line of the River Tract 16 intersects the northwest shore of the Maumee River; thence westerly along said north line of River Tract 16 to the center line of the Miami and Erie Canal; thence southwesterly along said center line of the Miami and Erie Canal to its intersection with the east and west center line of River Tract 16; thence westerly along said east and west center line of River Tract 16 to the west line of said River Tract 16; thence southerly along the west line of River Tracts 16 and 17 to its intersection with the center line of the central or main branch of Delaware Creek; thence southwesterly along the center line of the central or main branch of Delaware Creek to its intersection with the center line of Schneider Road; thence southeasterly along the center line of said Schneider Road and the southwesterly line of River Tract 18 to the intersection of the southwesterly line of River Tract 18 with the center line of Monroe Turnpike (Detroit Avenue so-called); thence southwesterly along the center line of said Monroe Turnpike (Detroit Avenue so-called) to its intersection with the center line of the Miami and Erie Canal; thence southwesterly along the center line of said the Miami and Erie Canal to the northwesterly and southeasterly center line of Grant 579; thence southeasterly along said northwesterly and southeasterly center line of Grant 579 to its intersection with the northwesterly shore of the Maumee River; thence northeasterly and along the northwest shore of said Maumee River to place of beginning."

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

The Board then went into executive session.

Mr. Hill, as Engineering Committee, presented his report on the various questions submitted to him, which were taken up in the following order:

The reports of the state inspector of plumbing, which had been presented at the previous meeting and referred to the engineering committee upon inspections at the following institutions:

- The Clark County Infirmary, Springfield.
- The Clark County Children's Home, Springfield.
- The Montgomery County Infirmary, near Dayton.
- The Dayton State Hospital.
- The Preble County Infirmary, Eaton.
- The Preble County Children's Home, Eaton.
- The Butler County Infirmary, Hamilton.
- The Butler County Children's Home, Hamilton.
- Miami College, Oxford.

Mr. Hill moved, and it was seconded by Dr. Grube that the recommendations contained in these reports be approved. Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill. In the negative, none.

The inspector's report also stated that the plans and specifications for the Lorain County infirmary building, the Lutheran school building at Oak Harbor, and a grade school building at Canton, had been reviewed and such changes recommended as would make them conform to the state law.

The Board then took up the question of proposed water supply for Bremen. It was moved by Mr. Hill and seconded by Dr. Grube that the village authorities be requested to drive one or more wells west of the present test wells, 400 or 500 feet outside of the village, to ascertain whether the same water cannot be obtained where it is less liable to pollution in the future during the time that the village or that part of it adjacent to the pumping station site, is lacking in a sanitary sewerage system.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Warner and seconded by Mr. Hartzell that the question of the proposed water supply for Oak Harbor be referred to the chief engineer, Mr. Pratt, for early investigation and report, with the understanding that, if such investigation should show that it is not feasible to make a change in location, as proposed by the Engineering Committee, the authorities be permitted to put down a well on the proposed location and arrangements be made for necessary tests to determine the quality and quantity of water available.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Hasencamp that the plan for a proposed storm water sewerage system for Hilliards, as shown on drawing prepared by Mr. E. E. Legg, consulting engineer of Columbus, and submitted by Mr. H. C. Gowdown, village solicitor, on July 24th, 1911, be approved, provided:

1st. That the village council pass an ordinance prohibiting the installation of any pipe or drain for the purpose of connecting the interior of any house or cellar with any of the village sewers; and that a certified copy of this ordinance be filed with the State Board of Health before the letting of any contracts for the construction of the proposed sewers; and

2nd. That this approval be void unless construction of the proposed sewerage system is begun before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Grube to approve the plans for sewerage and sewage purification for the village of Pleasant Ridge, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, on July 22nd, 1911, upon the following conditions:

1st. That the sewage purification plant be completed before any of the proposed sewers are placed in use;

2nd. That the plant be enlarged whenever in the opinion of the State Board of Health such enlargement becomes necessary;

3d. That the village council provide for the appointment of a sewer superintendent, and specify that he shall have responsible charge of the sewer system and sewage purification works; and that a certified copy of the ordinance providing for the appointment of such a superintendent be filed with the State Board of Health before the letting of any contract for construction work;

4th. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

5th. That this approval be void unless construction of sewage purification works is commenced before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the 8-inch well, 177 feet deep, located adjacent to the water works pumping station at Hiram and proposed as a source of additional water supply for the village; and also to approve the plan for the iron

removal plant submitted on July 11th, 1911, to be used to treat the water from said well, provided:

1st. That an adequate system of wash water troughs be installed at a height of three feet above the sand; and that the size of the main wash water outlet be increased to six inches;

2d. That samples of the filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and,

3d. That approval be void unless the plant is commenced before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Hasencamp to adopt the recommendation of the Engineering Committee that the whole matter of an additional water supply for the city of Cambridge be referred back to Professor Eno, the consulting engineer, and the city officials, together with a copy of the report of said committee, for further consideration. The said report was as follows: "The committee has gone carefully over the report of Professor Eno on the several sources of water supply discussed as follows: Wills Creek, Sarchet Run, Peters Creek. The Board will recall at its meeting June 1st, Columbus, that this matter was referred back to Professor Eno to further investigate the sources of supply which were not subject to sewage influence from settlements on Wills Creek above Cambridge, notably Byesville. Sarchet Run and Peters Creek it was thought, might now or at later date be combined, and would furnish a source of water supply not subject to sewage pollution. This reference was in accordance with the recommendation of the chief engineer as follows: 'Before approving the use of Wills Creek, it is believed that the city should present to the Board such data and estimates as have been obtained in regard to the development of other possible sources of supply, in order that the Board may be assured that whichever plan is carried out is in accordance with the city's best interests.' It is the opinion of the engineering committee from information before the Board, that if the cost between Wills Creek and Sarchet Run is only \$12,000 on a total outlay of \$182,000 that the city should take steps to secure its water supply from the better and safer source, notwithstanding the increased cost, and especially as the sewage pollution and mine waste in Wills Creek is bound to increase from year to year, and while the mine waste may not be regarded in the light of pollution, it is bound to impair the quality of the water and may interfere with filtration of the sewage polluted water."

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Hasencamp to withhold approval of the Minster water works until the following conditions have been complied with:

1st. That an iron removal plant of a design satisfactory to the State Board of Health be installed and placed in operation;

2d. That all privies and cesspools within 500 feet of the well be made watertight; and,

3d. That detailed plans showing the pumping station and arrangement of the system as completed be filed in the office of the State Board of Health.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hartzell to disapprove the plans for a proposed sewer for the Muskingum County Children's Home, submitted July 25th, 1911, by Mr. D. Y. Geddes, engineer for the Home; and to advise the directors of the Home to cause to be prepared plans for a suitable sewage disposal plant, and submit the same to the State Board of Health for approval.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

Mr. Hartzell, to whom had been submitted the special report on "A Study of the Collection and Disposal of City Wastes in Ohio," moved that this report be resubmitted to the Engineering Committee, and expressed the hope that it would be printed in full, with proper index. This motion was seconded by Mr. Hill and carried.

Dr. Warner, as chairman of the Finance Committee, presented a report including a list of vouchers showing expenditures made from July 16th to August 15th; and balances to date; and also requisitions that had been made for a table for the laboratory and books for the engineering department, at an estimated cost of \$19.00 for the former, and \$12.00 for the latter.

On motion of Mr. Hill, seconded by Dr. Grube, the report was approved.

Dr. Warner presented the bill of Dr. Hasencamp for expenses incurred as delegate to the meetings held in San Francisco and Los Angeles, California, and stated that he had held up the bill in order to bring it before the Board on request of Mr. Hill.

After some discussion as to the authority of the President to appoint a delegate to such meetings in place of some one who had been appointed by the Board but who was unable to attend, on motion of Dr. Grube, seconded by Mr. Hartzell this bill was approved.

Dr. Warner, as chairman of the Executive Committee, presented his report, stating that the Executive Committee had ordered the place of

meeting changed from Cedar Point to Toledo, on account of the lack of proper accommodations at the former place; and that on account of the illness of one of the stenographers in the engineering department, he had authorized the employment of a stenographer for one day.

This report was accepted.

The minutes of the July meeting were read and, on motion of Mr. Hill, were approved.

The Secretary then presented a report which was made by the special committee, Dr. Warner, Mr. Hill and the chief engineer, Mr. Pratt, appointed to consider the proposed water supply for Portsmouth, stating that after viewing the bar, examining the plans, and considering all the information relative to the problem, the committee failed to find sufficient evidence to insure, or even make probable, the success of the proposed system, and that it was therefore unanimously recommended that the proposed plan be disapproved.

On motion of Mr. Hill, seconded by Dr. Grube, the report and recommendation of the committee were approved.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Grube, Hartzell and Hill.

In the negative, none.

Dr. Grube called attention to the fact that the city of Dayton is proceeding to develop a new water supply without having secured the approval of the State Board of Health, and suggested that the Secretary inquire into this.

The Secretary presented the following letter of resignation:

COLUMBUS, OHIO, August 9th, 1911.

To the State Board of Health.

GENTLEMEN:—I hereby tender my resignation as Secretary of the State Board of Health, to take effect, if that should meet your favor, on September 15th, 1911.

Very respectfully,

C. O. PROBST, *Secretary.*

After considerable discussion, in which the Secretary was urged to reconsider his action, it was moved by Dr. Warner and seconded by Mr. Hartzell, that his resignation be accepted with sincere regret and that it take effect on September 30th, 1911, with the understanding that he be entitled to the usual two weeks annual vacation with pay.

The Secretary called attention to the necessity of making provision for the joint meeting with boards of health in October, and on motion this matter was referred to the President and Secretary to provide a program and make all necessary arrangements.

On motion of Dr. Grube, the Board then adjourned to meet in Columbus at 8 P. M., Thursday, September 14th, 1911.

Attest:

C. O. PROBST, *Secretary.*

Approved September 14th, 1911.

SEPTEMBER MEETING

1911

A regular meeting of the State Board of Health was held at the office of the Secretary, in Columbus, September 14th, 1911, at 8 P. M.

There were present Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

Mr. C. F. Cole, representing The National Company of South Bend, Indiana, contracting engineers, appeared before the Board in regard to a proposed water supply for Lodi, and asked the Board to approve the proposed site without making the installation of an iron removal plant a condition of approval.

Mr. J. C. Martin, manager of The Wilmington Water and Light Company, appeared before the Board in reference to a new well for an additional supply.

Mr. W. V. Hollingsworth, surveyor for Muskingum County, appeared before the Board in regard to the disposal of the sewage from the Muskingum County Children's Home near Zanesville.

The Board then went into executive session.

It was moved by Mr. Hill, and seconded by Dr. Grube, to approve the proposed water supply for Lodi, to be obtained from drilled wells located on the property of the Cleveland, Southwestern and Columbus Railway, situated in the extreme southerly portion of the village, upon the following conditions:

1st. That an iron removal process be installed to improve the quality of the water;

2d. That detailed plans of the development of the supply, including the iron removal plant, be submitted to and receive the approval of the State Board of Health; and,

3d. That this approval be void unless construction shall have been commenced before January 1st, 1912.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

On motion of Mr. Hill, it was voted to rescind the action taken at the August 10th, 1911, meeting, disapproving the plans for a proposed sewer for the Muskingum County Children's Home, submitted July 25th, 1911.

It was then voted, on motion of Dr. Warner, to refer this matter to a committee, consisting of Dr. Sutton and the chief engineer, Mr. Pratt, for investigation and report.

Dr. Warner, as chairman of the Finance Committee, submitted a report including a list of vouchers showing expenditures made from August 16th, to September 15th, 1911, and balances to date.

On motion of Mr. Hill, seconded by Dr. Grube, the report was approved as read.

The minutes of the August meeting were read and, on motion of Mr. Hill, approved as read.

On the part of the Executive Committee, Dr. Warner recommended that the chief clerk, James E. Bauman, be placed in charge of the affairs of the office pending the election of a secretary, and made a motion to this effect which was duly seconded and carried.

Mr. Hill, as Engineering Committee, offered his report and the questions were taken up in the following order:

It was moved by Dr. Warner and seconded by Dr. Sutton that the plan for constructing sewers in Canal Street, Canal Fulton, as shown on plan prepared by Mr. F. E. Meyers, consulting engineer, and submitted August 16th, 1911, be disapproved, and that the village be required to either postpone construction of sewers or cause to be prepared plans, satisfactory to the State Board of Health, for a comprehensive sewerage system including purification works.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Sutton and seconded by Mr. Hartzell to approve the plans submitted August 12th, 1911, by Mr. Robert Hoffmann, city engineer of Cleveland, for a sewage disposal plant for the Cleveland Boy's Farm located at Hudson, provided:

1st. That all samples of filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being used;

2d. That detailed drawings of all dosing apparatus be filed with the State Board of Health as soon as same has been adopted; and,

3d. That this approval be void unless the plant is completed on or before January 1st, 1913.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Grube to disapprove the proposed site for public water supply wells for the village of Payne, adjacent to the existing electric light plant in the village, and to instruct the Secretary to advise the board of trustees of public affairs to change their plans and locate the supply wells outside the built-up portion of the village; which would not necessarily mean the separation of the pumping station and electric light plant if the wells are

pumped by electrically driven pumps fed with current generated at the village plant.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Sutton to require the village of Cuyahoga Falls to prepare plans for the systematic construction of sanitary sewers, or the interception of sewage from the present sewers with a view to collecting all of the village sewage at one point and there purifying it when necessary; and to prohibit the use of the North Side sewer recently constructed, as well as all other illegally installed sewers unless the sewage from such sewers be intercepted in accordance with the plan suggested above.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Warner, to approve for an additional public supply well for the village of Wilmington, the site located in the county infirmary grounds just outside the southeasterly corporation limits.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the sites "A" and "B" for public water supply purposes for the village of Malvern, as shown on plan received on September 11th, 1911, provided that, by means of test wells, it is shown that water of sufficient quantity and of a quality satisfactory to the State Board of Health can be obtained.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Hasencamp and seconded by Mr. Hartzell, to disapprove the plans for proposed sewerage for District No. 4, Canton, submitted by Mr. P. H. Weber, city engineer, August 16th, 1911, until such time as the city has commenced the construction of a new sewage purification plant to be located on a site satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Sutton to approve the plans submitted by R. E. Hamilton, engineer for the village of West Lafayette, on August 11th, 1911, showing proposed modifica-

tions in the plans for storm water sewer approved by the Board on July 19th, 1911.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Hasencamp to approve the plans for proposed storm sewers at Ada, submitted by Mr. J. C. Poling, county surveyor, on August 12th, 1911, upon the following conditions:

1st. That the village council, by ordinance, compel the removal of all present sanitary connections with all sewers leading into the proposed outlet, and, furthermore, prohibit any future sanitary connections with such sewers; and,

2nd. That a certified copy of this ordinance be filed with the State Board of Health before construction of the proposed sewers is commenced.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Warner that the recommendations of the Engineering Committee in regard to the water supply for Bremen be adopted. These were that the proposed source of water should not be approved by the Board, and that the Board instruct its chief engineer to make a personal examination of the situation, and locate a feasible source of water supply, free from the objections that have been raised by the Board, and also free from the objections that have been raised by the consulting engineer and the village officials of nearby alternative sources, and submit his report thereon to the Engineering Committee at the earliest date, for such action as it may be deemed advisable to take upon reception of the report.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was then moved by Dr. Sutton and seconded by Dr. Warner that the report of the Engineering Committee be adopted.

The motion was carried.

The Secretary presented the report of the special committee appointed to investigate the complaint of the clerk of Center Township, Williams County, that the Bryan Fertilizer Factory was causing a nuisance by the discharge of wastes into a running stream near Bryan.

On motion of Mr. Hill, seconded by Dr. Warner, the report was adopted; the recommendations of the committee being that the complainant be notified that the Bryan Fertilizer Company, whenever it discharges the contents of its cooking kettle into the small stream in the rear of the factory is violating section 12646 of the General Code and

is liable to prosecution under this act; and, furthermore, that it is entirely feasible to dispose of the waste material without discharging it into the stream.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

The Secretary presented the report of the special committee, Dr. Hasencamp and the chief engineer, Mr. Pratt, upon their investigation of the complaint of the clerk of York Township, Fulton County, that the Van Camp Packing Company was polluting a stream by the discharge of the wastes from its plant in the village of Wauseon; and the complaint of the clerk of Clinton Township, Fulton County, that Turkey Foot Creek was being polluted by the sewage of Wauseon.

It was moved by Mr. Hill and seconded by Mr. Hartzell to adopt the report of the special committee, in which it was stated that the village of Wauseon had installed, contrary to law, two sewer outlets discharging into Turkey Foot Creek, or branches thereof, and that these outlets are now the cause of unsanitary conditions detrimental to the health and comfort of persons living in Clinton and York townships below the village; and to reaffirm the advice given to the village in a communication, under date of October 26th, 1905, which was as follows:

"This Board would call attention to the fact that the present method of disposing of the sewage of Wauseon is dangerous to the health of the inhabitants of the village, as well as to persons living along the creek below town, and plans, satisfactory to the State Board of Health, for a proper system of sewerage for house sewage only, including provision for sewage purification, should be prepared and all future sewers should be built in accordance with this plan.

"The use of the present sewers for domestic sewage should, as fast as practicable, be discontinued and the houses now discharging therein should be connected to proper domestic sewers leading to a purification plant. The present sewers could be, unobjectionably, continued in use as storm sewers."

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

The Secretary was instructed to notify the mayor and council of Wauseon of this action and to call their attention to the fact that the village is responsible for any pollution of the creek caused by the discharge of wastes from The Van Camp Packing Company's plant through the village sewers.

The Secretary presented a report by the chief engineer relative to sanitary conditions governing bathing in Lake Erie within the city of Cleveland.

On motion of Mr. Hill, seconded by Dr. Grube, the report was adopted and the Secretary instructed to send a copy of the report to the board of health of Cleveland.

At this juncture the question of the conference of health officials to be held in Chicago on September 29th, 1911, to discuss questions relating to lake pollution was brought up by Dr. Warner.

On motion of Dr. Warner, it was voted to send a delegation of three to this conference, to consist of the President and two members to be appointed by the Chair.

The President then appointed Dr. Sutton and Dr. Warner as the other delegates.

On motion of Dr. Grube, it was voted that in case either of the delegates should be unable to go to this meeting the President be authorized to appoint some other member in his stead.

The Secretary presented a report of the special committee, consisting of the Secretary and the state inspector of plumbing, upon proposed interpretations of certain features of the Ohio State Building Code relating to plumbing.

On motion of Mr. Hill, duly seconded, it was voted to adopt the report of the committee.

The Secretary presented a petition from C. A. Rusler, clerk of Shawnee Township, Allen County, asking the Board to investigate the pollution of the Ottawa River (Hog Creek) by sewage and other wastes from the city of Lima.

On motion of Mr. Hill, the matter was referred to the chief engineer for investigation and report.

The Secretary presented a petition from P. W. Hanenkratt, clerk of Emerald Township, Paulding County, asking the Board to investigate the pollution of Big Flatrock Creek by sewage and other wastes from the plant of the German American Sugar Company at Paulding.

On motion of Mr. Hill, this matter was referred to the chief engineer for investigation and report.

The Secretary presented letters to the Governor which had been referred to him, in reference to the Ironton water supply.

On motion of Dr. Warner, these were referred to the Engineering Committee, Mr. Hill.

The Secretary presented his report which, on motion of Dr. Warner, seconded by Mr. Hill, was adopted.

The Secretary presented a communication from H. D. Messick, an attorney of Cleveland, complaining of a nuisance caused by the condition of the filtration tank of the sewerage system at Beachland.

On motion of Dr. Warner, this matter was referred to the Engineering Department for investigation and report.

The Secretary presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Mr. Hill and seconded by Mr. Hartzell to approve these health officers.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

The Secretary presented applications for license to conduct maternity boarding houses, which were taken up in the following order:

It was moved by Dr. Warner and seconded by Mr. Hill to grant a license to Mrs. J. L. McClelland, at 929 Fruit Avenue, Cleveland, to conduct a maternity boarding house and lying-in hospital, limiting the number to three women and five children.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to grant a license to Mrs. Clara LeRoy to conduct a maternity boarding house and lying-in hospital at 2433 East 55th Street, Cleveland, to be known as the Central General Hospital, limiting the number to three women and seven children.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to renew the license of Mrs. Zella Briggaman, to conduct a maternity boarding house at 1432 East Rich Street, Columbus, limiting the number of children to ten.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Sutton to renew the license to The Florence Crittenton Home, 1166 East Main Street, Columbus, limiting the number to six women and twelve children.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Grube to renew the license to The Florence Crittenton Home, 1161 McGuffey Street, Youngstown, to conduct a maternity boarding house and lying-in hospital, limiting the number to ten women and ten children.

Those voting in the affirmative were Messrs. Miller, Warner, Hasencamp, Hartzell, Grube, Hill and Sutton.

In the negative, none.

The Secretary presented a report of the state inspector of plumbing upon his examination of certain public institutions, and recommendations for changes in the plumbing of these institutions.

On motion of Dr. Hasencamp, the report was referred to the Engineering Committee.

The Secretary, in view of his leaving office, presented an inventory of all furniture, carpets, and other office equipment including apparatus and supplies, and books, in the general office, engineering department, laboratories, and state inspector of plumbing office.

On motion of Mr. Hill, it was voted to receive this inventory and refer it to the chief clerk to be filed with the proper authority.

The question of program for the joint meeting in Cincinnati in October was brought up and the Secretary reported that he had just received from the President, Dr. Miller, the other member of the committee on program, his acceptance of topics proposed for the meeting.

On motion of Dr. Warner, Dr. Sutton and the chief clerk, Mr. Bauman, were added to the committee to complete the program for this meeting.

On motion of Dr. Grube, it was voted to appoint a committee of three, of which Mr. Hartzell should be chairman, to draft suitable resolution of regret regarding the retirement of Dr. C. O. Probst as Secretary of the Board.

The Chair appointed Dr. Grube and Dr. Hasencamp as the other two members of this committee.

Mr. Hill presented a communication and map relative to a proposed sewer for the village of Batavia, and moved that this be referred to the Engineering Department for investigation and report.

The motion was carried.

The Board then adjourned to meet in Cincinnati at 8 P. M., October 18th, 1911.

Attest:

C. O. PROBST, *Secretary*.

Approved October 18th, 1911.

OCTOBER MEETING

1911

A regular meeting of the State Board of Health was held at the Sinton Hotel, Cincinnati, October 18th, 1911, at 8 P. M.

There were present Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

Mr. C. W. Golden, mayor of Ironton, appeared before the Board in reference to the water supply, and asked the Board to urge the Governor and the Attorney General to approve the Board's order requiring the city of Ironton to install a purification plant, satisfactory to the State Board of Health, by December 1st, 1911. Mr. J. M. Howell, director of public service, presented a letter from Mr. Philip Burgess, the consulting engineer, in which it was stated that there had been some delay at the foundry of the R. D. Wood Company, contractors, due to a misunderstanding as to the drilling of the pipes, but that the material should be delivered at an early date and he was that day writing the contractors in regard to the same. Mr. Hill submitted a letter, under date of October 16th, 1911, from the mayor of Ironton, giving a resumé of the actions taken by the authorities of Ironton and urging the State Board to insist upon the city of Ironton installing a filtration system.

This matter was referred to executive session.

Dr. L. W. Campbell, mayor of Ada, appeared before the Board, protesting against the Board's action of September 14th, 1911, requiring, in its approval of plans for storm water sewers, the removal of all present sanitary connections with the sewers leading to the proposed outlet and prohibiting any future connections with such sewers. Mr. Pratt, the chief engineer, spoke on the past actions of the Board, and Mr. J. E. Lowry, representing the property holders affected by the lack of drainage, spoke on the inability of the village to raise the money to purify the sewage. Mr. A. E. Smith, president of the Ohio Northern University, spoke in regard to needed relief from overflowed land.

This matter was referred to executive session.

Mr. W. P. Lamb, member of the council of Payne, appeared before the Board and asked a reconsideration of the Board's action of September 14th, 1911, disapproving site for proposed water supply.

This matter was referred to executive session.

Mr. J. C. Martin, manager of the Wilmington Water and Light Company, appeared before the Board and submitted data concerning the water supply.

Mr. Hill recommended that the water company be advised to confer with parties making complaint and endeavor to come to an understanding in regard to the ability of the water company to improve its water supply.

This recommendation was adopted.

The Board then went into executive session.

The question of the Ironton water supply was taken up and it was decided that there was no further action for the Board to take at this time.

The request of the authorities of the village of Ada relative to the discharge of domestic sewage into the proposed storm sewers was taken up, and on motion of Mr. Hill, seconded by Dr. Hasencamp, the matter was laid upon the table.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The question of approving the proposed site for water works for the village of Payne was taken up, and on motion of Mr. Hill, seconded by Mr. Hartzell, it was voted to reaffirm the Board's previous action disapproving the site adjacent to the existing electric light plant for public water supply wells.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The minutes of the September meeting were read and on motion of Mr. Hill, seconded by Dr. Sutton, approved.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

Mr. Hill moved that the Ohio State University be requested to conduct such experiments and tests as are necessary to determine the efficiency of methods and appliances which are permitted in the new State Building Code. This motion was seconded by Dr. Miller and carried.

Dr. Warner, as chairman of the Finance Committee, submitted a report including a list of vouchers showing expenditures made from September 16 to October 15th, 1911, and balances to date.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve this report.

Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

Dr. Warner, as chairman of the Executive Committee, presented a report, and his recommendations were taken up in the following order:

1st. That the salary of R. T. Kennedy, assistant in the laboratory, be increased from \$720.00 to \$830.00 per annum.

It was moved by Mr. Hill and seconded by Dr. Grube to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

2. That the purchase of lumber for shelving in the laboratory be authorized; the carpenter work to be done by the State House carpenter without expense to the Board; and

3. That the purchase of plate glass tops for certain tables in the diagnostic laboratory be authorized; these tops to be cut from salvage at a considerable saving in cost.

4. The purchase of a vacuum cleaner for the office is recommended.

It was moved by Dr. Miller and seconded by Mr. Hill to adopt recommendations 2, 3 and 4.

Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

5. The purchase of a field outfit, including a microscope, is recommended.

It was moved by Mr. Hill and seconded by Dr. Grube to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

6. It is recommended that, pending the election of a Secretary, Mr. Bauman be authorized to use the title "Acting Secretary" without change in his present position.

It was moved by Dr. Miller and seconded by Dr. Grube to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

7. It is recommended that a set of "Dillon on Municipal Corporations" be purchased for the Secretary's office.

It was moved by Mr. Hill and seconded by Mr. Hartzell to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

8. It is recommended that a book entitled "Practical Bacteriology, Blood Work and Parasitology" be purchased for the library for use in the laboratory. Price \$1.50.

It was moved by Mr. Hill and seconded by Mr. Hartzell to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

9. The purchase of a rug for the Engineering Department is recommended.

It was moved by Mr. Hill and seconded by Dr. Grube to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

10. It is recommended that the resignation of R. Winthrop Pratt, chief engineer, be accepted with much regret, to take effect December 1st, 1911, and that Mr. Pratt be allowed the customary vacation, which would begin November 16th, 1911.

It was moved by Dr. Grube and seconded by Dr. Sutton to adopt this recommendation. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

11. It is recommended that when Mr. Pratt leaves the service of the Board, Mr. W. H. Dittoe be placed in charge of the Engineering Department for sixty days, with the understanding that if during that time his services are satisfactory, he be appointed chief engineer.

It was moved by Dr. Warner and seconded by Mr. Hartzell that this recommendation be adopted. Those voting in the affirmative were Messrs. Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

A letter was presented from the Auditor of State, calling attention to the failure to itemize expense accounts.

It was moved by Dr. Warner and seconded by Mr. Hartzell that the acting secretary be instructed to prepare blanks for itemized expense accounts.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

Mr. Hill, as Engineering Committee, submitted his report, and the questions were taken up in the following order:

It was moved by Dr. Sutton and seconded by Dr. Miller to approve the proposed water works site for Oak Harbor which is bounded by Walnut Street, Park Street, Church Street and the Wheeling and Lake Erie Railroad, as shown on plans submitted by the board of trustees of public affairs on August 4th, 1911, and also the use of the two wells which have been recently sunk on said site provided:

1st. That no additional wells be installed without first obtaining the approval of the State Board of Health; and,

2nd. That an iron removal plant of a design satisfactory to the State Board of Health be included in the new water works, and that same be used to remove the objectionable excess of iron which is present in the water.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Hasencamp to approve the plan for the proposed site for a sewage purification plant for Canton, submitted by Mr. Ray F. Harbert, director of public service, on October 7th, 1911, the said site being located about five miles south of the center of the city and three miles south of the present sewage purification plant.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller, to disapprove the scheme proposed for the purification of the sewage at Beachland, a summer resort on the shore of Lake Erie, within the corporate limits of Nottingham, as shown on sketch submitted by Mr. George Anderson on September 22nd, 1911; and to advise the health officer of Nottingham that he should notify the residents of Beachland that they should install a sewage purification plant of ample capacity for present and future needs, designed in accordance with modern practice.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the plan for sewerage for the village of Batavia, as shown on drawing submitted by Mr. Thomas Glancy, September 8th, 1911, provided the village first have prepared plans for sewage purification, satisfactory to the State Board of Health, consisting of tanks and filters, and that the tanks be constructed as soon as the sewers are built and used until such time as, in the judgment of the State Board of Health, a nuisance is found to result from the discharge of the effluent into the river; and whenever such nuisance is found the village shall install the filters.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The Engineering Committee then reported that he had carefully examined the reports of the state inspector of plumbing on his investigation at the following institutions:

The Longview Hospital, Carthage.

The Hamilton County Infirmary, Carthage.

The O. S. & S. O. Home, Xenia.

The Greene County Infirmary, Xenia.

The Greene County Children's Home, Xenia.

The Madison County Infirmary, London.

The Madison County Children's Home, London.

The Wilberforce University, Wilberforce.
The Warren County Infirmary, Lebanon.
The Crawford County Infirmary, Bucyrus.
The Wyandot County Infirmary, Upper Sandusky.
The Marion County Children's Home, Marion.
The Marion County Infirmary, Marion.
The Champaign County Children's Home, Urbana.
The Champaign County Infirmary, Urbana.
The Miami County Children's Home, Troy.
The Miami County Infirmary, Troy.

He recommended that these reports be approved and that copies of the individual reports with recommendations be sent to the superintendent of each institution with the request that it be acknowledged and a statement be made to the Secretary in regard to the steps that would be taken in order to comply with the recommendations of the Board.

It was moved by Dr. Hasencamp and seconded by Dr. Grube to approve the report of the Engineering Committee.

Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

Dr. Warner called for the report of the Engineering Committee on the special report on "A Study of the Collection and Disposal of City Wastes in Ohio."

It was moved by Mr. Hill and seconded by Mr. Hartzell that the Acting Secretary be instructed to take up the question of the printing of this report with the Supervisor of Public Printing.

Dr. Warner, as chairman, presented the report of the committee consisting of Drs. Warner, Miller and Sutton, appointed to attend a conference at Chicago, Ills., relative to the preservation of the purity of the great lakes.

On motion of Mr. Hill, seconded by Dr. Grube, this report was received and ordered filed.

The Board then considered the report of the special committee, Dr. Sutton and the chief engineer, upon reconsidering the plans for a proposed sewer at the Muskingum County Children's Home, near Zanesville; the authorities having requested permission to dispose of the sewage from the Home until spring by discharging it into the large existing cesspool on the grounds of the institution.

It was moved by Dr. Grube and seconded by Mr. Hartzell to grant permission to use said cesspool until May 1st, 1912, and to require that plans for a suitable sewage purification plant be submitted to the State Board of Health for approval not later than February 1st, 1912.

The committee appointed to draft resolutions upon the resignation of Dr. Probst submitted the following:

RESOLUTIONS OF REGRET AND APPRECIATION ADOPTED BY THE
STATE BOARD OF HEALTH UPON ACCEPTING THE
RESIGNATION OF DR. C. O. PROBST FROM THE
SECRETARYSHIP OF THE BOARD.

WHEREAS, We believe that the retirement of Dr. C. O. Probst from the secretaryship of the State Board of Health is a real loss to the Board and to the State of Ohio; therefore,

Be it resolved by the State Board of Health, That we hereby express to Dr. Probst our regrets at losing his services; and at the same time our high appreciation of the great good he has accomplished while in office.

We recall that when he entered the office twenty-five years ago, the health laws of the State were in a chaotic condition, and that much of the excellent Sanitary Code now in force in this State, is due to his untiring efforts.

With this expression of regret and appreciation is coupled the best wishes of the State Board of Health for the future success and usefulness of Dr. Probst. We do not believe that his retirement from the secretaryship means his retirement from professional life or from his continued activity in behalf of public welfare, also.

Be it further resolved, That these resolutions be transcribed upon the minutes of the State Board of Health, and that a copy of them be furnished the editor for publication in the Ohio State Medical Journal.

(Signed) JOSIAH HARTZELL,
OSCAR HASENCAMP,
ROBERT H. GRUBE,
Committee.

On motion of Mr. Hartzell, seconded by Dr. Grube, these resolutions were adopted. Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary presented his report which, on motion of Mr. Hartzell, seconded by Dr. Grube, was adopted.

The Acting Secretary presented a petition from M. E. Gustin, clerk of Turtlecreek Township, Warren County, asking the Board to investigate the pollution of Turtlecreek by the sewage and other wastes from the village of Lebanon.

On motion of Mr. Hill, seconded Dr. Grube, this matter was referred to the Engineering Department for investigation and report.

The Acting Secretary presented a communication from Mr. C. K. Southard, an attorney of Toledo, relative to the pollution of Ten Mile Creek, and asking that the plant of the Zehner Bros. Packing Company be visited by the Board and the condition of the creek investigated.

Dr. Hasencamp, a member of the committee having under consideration the complaints regarding the pollution of Ten Mile Creek, stated that he had communicated with Mr. Southard and there was nothing further to be done at this time.

The plans of C. C. and A. L. Thayer, architects of New Castle, Pa., for the district tuberculosis hospital to be built by the counties of

Columbiana, Stark, Summit and Portage, near the city of Akron, were presented.

It was moved by Mr. Hartzell and seconded by Dr. Hasencamp that these plans be approved. Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary presented a list of health officers, appointed by their respective councils to serve in lieu of a board of health.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve these health officers. Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary presented the following applications for license to conduct a maternity boarding house and lying-in hospital:

Mrs. R. Jewell, 628 Mt. Vernon Avenue, Columbus.

Mrs. Evangeline Reams, 73 North Harris Ave, Columbus, to be known as Salvation Cottage. (Renewal.)

It was moved by Dr. Hasencamp and seconded by Dr. Grube to grant license to the above named applicants. Those voting in the affirmative were Messrs. Warner, Hartzell, Hill, Sutton, Hasencamp, Grube and Miller.

In the negative, none.

It was then moved by Mr. Hartzell and seconded by Dr. Grube that the next meeting of the Board be held on the third Thursday in November (the 16th), in Cleveland.

On motion of Mr. Hartzell, seconded by Dr. Grube, the Board ajourned.

Attest:

JAMES E. BAUMAN,
Acting Secretary.

Approved November 21st, 1911.

NOVEMBER MEETING

1911

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, November 21st, 1911, at 10 A. M.

There were present Drs. Warner, Hasencamp, Grube and Miller.

Mr. W. J. McLaughlin, city solicitor, Mr. J. W. Rowland, director of public service, and Mr. A. L. Metheany, city engineer, of Lima, appeared before the Board in regard to the chemical treatment of the public water supply of that city.

Mr. Pratt, the chief engineer, explained to the Board the conditions under which Lima is treating the public water supply.

Mr. Pratt then made a statement concerning the cooperative work between the State Board of Health and the city of Cleveland relative to the effect the discharge of sewage into the lake has upon the public water supply and the bathing beaches.

On motion of Dr. Grube, seconded by Dr. Miller, the minutes of the October meeting were approved as read.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller. Mr. Hill in a letter of November 20th, asked to have his vote recorded "Aye".

In the negative, none.

On motion of Dr. Grube, seconded by Dr. Hasencamp, the monthly report of the Acting Secretary was approved as read.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller. Mr. Hill, in letter of November 20th, asked to have his vote recorded "Aye".

In the negative, none.

The report of the Finance Committee, stating expenditures from October 16th to and including November 15th, 1911, and balances to November 15th, 1911, was, on motion of Dr. Grube, seconded by Dr. Hasencamp, approved.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller. Mr. Hill, in letter of November 20th, asked to have his vote recorded "Aye".

In the negative, none.

The report of the Engineering Committee was presented and the various questions were taken up and disposed of in the following order:

It was moved by Dr. Grube and seconded by Dr. Miller to approve the plans for sewerage and sewage purification for Wilmington, as

shown on drawings submitted by The Riggs and Sherman Company, October 14th, 1911, upon the following conditions:

1st. That the sewage purification plant be completed before any of the proposed sewers are placed in use;

2nd. That the plant be enlarged whenever in the opinion of the State Board of Health such enlargement becomes necessary;

3rd. That the village council provide for the appointment of a sewer superintendent, and specify that he shall have responsible charge of the sewer system and sewage purification works; and that a certified copy of the ordinance providing for the appointment of such a superintendent be filed with the State Board of Health before the letting of any contract for construction work;

4th. That the sand bed be underlaid with a suitable layer of gravel, and that all samples of filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

5th. That this approval be void unless construction of sewage purification works is commenced before January 1st, 1913.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary was instructed to call the attention of the consulting engineers to the fact that the form of sedimentation tanks provided for in their plans is not in accordance with what is considered best practice and that such tanks should be made deepest at inlet end.

It was moved by Dr. Miller and seconded by Dr. Grube that the general plan submitted October 20th, 1911, by Mr. A. C. Reed, village engineer, for a sewerage system for the village of Pleasant Hill, providing for the discharge of untreated sewage into the Stillwater River, be approved upon the following conditions:

1st. That sewage purification works be installed whenever deemed necessary by the State Board of Health, and with this in view that the outfall sewer be constructed with such grade and elevation as to permit of the installation of a gravity plant;

2nd. That the outlet be submerged and carried to a point in the Stillwater River at least 20 feet from the bank;

3rd. That detailed plans and profiles of the sewerage system, including the outfall sewer and outlet, be submitted to and receive the approval of the State Board of Health;

4th. That accurate records be kept of the location and nature of all connections to the sewers, by a properly appointed official; and,

5th. That this approval be void unless construction shall have been begun before July 1st, 1912.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Hasencamp to disapprove the plans submitted October 5th, 1911, for a proposed water supply for the village of Albany, the said supply to be obtained from a spring located on a hillside in the western portion of the village outside of the built up district; and to advise that search be made for a more satisfactory supply, but in the event of failure to locate such a supply that detailed revised plans providing for proper protection of the present proposed supply be prepared and submitted to the State Board of Health.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary was instructed to call the attention of the authorities to the fact that the Board has had under advisement at different times water supplies that were installed solely for fire protection with full knowledge that the water was not suitable for drinking and domestic purposes, and that in nearly every case such supply has been used for drinking and domestic purposes in spite of any precautions that the local authorities made to prevent such use.

It was moved by Dr. Grube and seconded by Dr. Hasencamp to approve the plans for proposed sewage disposal for the Kensington Addition to the city of Columbus, submitted by Mr. A. Elliott Kimberly, consulting engineer, on October 27th, 1911, upon the following conditions:

1st. That the disposal system be enlarged if at any time, in the opinion of the State Board of Health, such enlargement becomes necessary;

2nd. That no direct closet connections to the sewer be permitted;

3rd. That the overflow from the dosing tank into Alum Creek be used only during extreme storm flow; and,

4th. That this approval be void unless construction shall have been begun prior to May 1st, 1912.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Hasencamp and seconded by Dr. Grube to approve the plans for a proposed private sewer for the E. T. Collins Sub-division, located in the extreme northerly portion of the city of Toledo, submitted November 7th, 1911, provided:

1st. That a sedimentation tank of a design satisfactory to the State Board of Health be installed for the partial purification of the sewage before discharging it into Ten Mile Creek;

2d. That the outlet from the tank be carried to the center of the stream and be submerged at all stages of the stream; and,

ANNUAL REPORT

3d. That this approval be void unless construction shall have been begun before March 1st, 1912.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Miller to approve the proposed change in obtaining a new water supply for Lodi from a dug well on the property of the Cleveland, Southwestern and Columbus Railway, submitted in a communication from The National Company of South Bend, Indiana, under date of October 31st, 1911, upon the following conditions:

1st. That an iron removal process be installed to improve the quality of the water;

2d. That detailed plans for the development of the supply, including an iron removal plant, be submitted to and receive the approval of the State Board of Health;

3d. That the council and the board of trustees of public affairs of the village take immediate steps to pass such ordinances or regulations as will effectually prevent further contamination of the district occupied by the water supply wells and file a copy of same with the State Board of Health; and,

4th. That this approval be void unless construction shall have been commenced before January 1st, 1912.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

Mr. Dittoe, the assistant engineer, was instructed to furnish the Engineering Committee with a statement regarding the liability of contamination of the district occupied by the water supply wells.

It was moved by Dr. Grube and seconded by Dr. Hasencamp to approve the general project of purifying the public water supply of Lima, in compliance with the Board's order of February 25th, 1911, by treatment with calcium hypochlorite as outlined in the communication and plan received from Mr. W. J. McLaughlin, city solicitor, on April 8th, 1911, upon the following conditions:

1st. That detailed plans and specifications of the plant for the treatment of the water be submitted to and receive the approval of the State Board of Health; and that such plans be so prepared that the tanks and devices for applying the calcium hypochlorite as well as the basins for holding the treated water be so arranged that they can be incorporated in a future filtration plant;

2d. That there be installed, when deemed necessary by the State Board of Health, means for filtering the water in connection with the use of calcium hypochlorite, or in connection with the use of a coagulant, or in connection with both;

3d. That a competent chemist and bacteriologist, satisfactory to the State Board of Health, be placed in charge of the operation of whatever plant may be installed; and that the operator maintain complete records of the operation of the plant and furnish copies of same to the State Board of Health; and,

4th. That this approval be void unless satisfactory plans shall have been submitted prior to March 1st, 1912, and construction of the plant begun prior to June 1st, 1912.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary was instructed to call the attention of the authorities of Lima to the following facts:

1st. That investigations of the State Board of Health have demonstrated that the water supply from Lima Lake, while usually safe, is at times contaminated and unsafe, and that its physical characteristics are objectionable;

2d. That while the hypochlorite treatment properly conducted is efficient in the extinction of intestinal bacteria, it has no effect in improving the physical characteristics of the water; and,

3d. That the hypochlorite treatment if used should more properly supplement the process of filtration.

The Board then took up the report of the special committee, Mr. Pratt, upon his investigation of the existing sewerage of Lima made in answer to a complaint from the clerk of Shawnee Township, Allen County.

It was moved by Dr. Grube and seconded by Dr. Hasencamp that the report be adopted and that the authorities of Lima be notified that it was found that the Ottawa River is being grossly polluted by the sewage from Timberlake, Watt Town and Askins sewers, and, furthermore, that the discharge of sewage from these sewers into the Ottawa River is in direct violation of the action of the State Board of Health of May 8th, 1900, approving the plans for these sewers upon the condition that the sewage should be purified before the sewers were used.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary was instructed to call the attention of the authorities to their violation of the Board's approval of May 8th, 1900, and to state that the State Board of Health will require the city of Lima to prepare plans for a sewage purification plant, suitable for purifying the sewage from Timberlake, Watt Town and Askins sewers, and submit the same to the Board for approval not later than March 1st, 1912, the installation of such sewage purification plant, in accordance with approved plans, to be begun not later than July 1st, 1912; and in

the event that the city fails to take this action, the matter will be referred to the Attorney General's department for legal procedure.

The Acting Secretary stated that by direction of the President and on suggestion of the Engineering Committee, the Attorney General had been requested to take action to prevent the use of a public water supply installed in the village of Bremen, the Board having disapproved the source of supply.

Dr. Warner, as chairman of the Executive Committee, presented the following report:

1st. Arrangements having been made to print the special report on "A Study of the Collection and Disposal of City Wastes in Ohio", it is recommended that 200 copies of the report be bound in cloth. This will have to be done at the expense of the Board and will cost \$50.00.

2d. Requisition having been made by the Engineering Department, it is recommended that two field sampling kits, made to order, be purchased at a cost of \$25.00.

3d. The purchase of a manuscript case for the Secretary's office has been verbally authorized.

4th. Requisition having been made by the laboratory, it is recommended that a book on "Microbiology", price \$2.50, be purchased.

5th. It is recommended that the salary of the epidemiologist, Dr. Frank G. Boudreau be increased to \$2,000.00 from January 1st, 1912.

It was moved by Dr. Grube and seconded by Dr. Miller that the report of the Executive Committee be approved.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

On recommendation of the Executive Committee and on motion of Dr. Hasencamp, seconded by Dr. Grube, it was voted to send the Acting Secretary to the meeting of the American Public Health Association at Havana, Cuba, December 4th-9th inclusive.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The employing of a stenographer for the state inspector of plumbing and the epidemiologist was left to the Executive Committee, on motion of Dr. Grube, seconded by Dr. Miller.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The President presented a communication relative to securing quarters for the laboratories outside of the State House, in accordance with a request from the Adjutant General.

On motion of Dr. Grube, seconded by Dr. Hasencamp, the President and Acting Secretary were appointed a committee to investigate

and see what could be done in the way of securing quarters for the laboratories and also the other departments of the State Board of Health, outside of the State House.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

Dr. Warner, as chairman of the Executive Committee, reported progress in looking for a bacteriologist.

On motion of Dr. Grube, seconded by Dr. Miller, the Executive Committee was authorized to continue to look for a bacteriologist and to go wherever necessary in making the investigation.

A request was presented from C. O. Richey of Toledo, for permission to disinter and remove the bodies of Elizabeth Sommersett and Solomon Reece Longworth from Dix Cemetery, Pleasant Township, Van Wert County, to Woodland Cemetery adjacent to the city of Van Wert, Ohio, the cause of death having been smallpox.

On motion of Dr. Grube, seconded by Dr. Hasencamp, the removal of bodies of persons having died of smallpox was left to the executive officer of the Board.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The Acting Secretary presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health, and who had been vouched for by five property holders of their respective villages.

On motion of Dr. Grube and seconded by Dr. Hasencamp, the above named health officers were approved with the exception of E. B. Mackey of East Youngstown, whose appointment was referred to the President for further investigation; and it was decided to adopt a rule to refer all future appointees to the president of their respective county medical societies for endorsement before approving them as health officers to serve in lieu of a board of health.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The application of Anna Lienesch for a renewal of her license to conduct a maternity boarding house at 2703 Colerain Avenue, Cincinnati, was considered and on motion of Dr. Miller, seconded by Dr. Grube, this license was granted, limiting the number to two infants.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The application of Mrs. Minnie Braessler to conduct a maternity boarding house at 6401 Lexington Avenue, Cleveland, was presented, and

on motion of Dr. Miller, seconded by Dr. Grube, this license was granted, limiting the number to six children.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

The following statement was presented from Mr. Pratt, the chief engineer.

To the State Board of Health. "COLUMBUS, OHIO, November 15th, 1911.

GENTLEMEN:—As the members of the Board already know, the new state building code makes it necessary that each residence sewage disposal plant be approved by the State Board of Health before it is placed in use; also that in all communities of less than 5,000 it is necessary to secure from the State Board of Health a permit to build a cesspool.

As the requests for approval of these individual plants will continue to become more and more numerous, it is impracticable to write a complete report for each for presentation to the Board in a formal manner, as is done with municipal plants.

It is, therefore, recommended that the Board authorizes its chief engineer:

1st. To approve or disapprove all sewage disposal plants for single residences; and,

2nd. To issue permits for cesspools when the conditions so warrant.

It is further recommended that the chief engineer be instructed to prepare for each meeting of the State Board of Health a list of residential sewage disposal plants and cesspools acted upon as above, in order that the Board may confirm the approvals and the permits.

Respectfully,

(Signed) R. WINTHROP PRATT,
Chief Engineer."

On motion of Dr. Hasencamp, seconded by Dr. Grube, the above recommendations were approved.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller. In the negative, none.

Dr. Warner stated that Miss Halderman's condition was such that it would not be advisable for her to return to work on January 1st, 1912.

On motion of Dr. Grube, seconded by Dr. Miller, the time of Miss Halderman's return to work was left with the President.

On motion of Dr. Miller, seconded by Dr. Hasencamp, the arranging of the program and details for the January conference with city and village boards of health was referred to a committee consisting of the President and Acting Secretary.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube and Miller. In the negative, none.

The President announced the appointment of Dr. Sutton and Dr. Hasencamp as members of the Finance Committee.

The report of the state inspector of plumbing was presented with the statement that the report had been approved by the Engineering Com-

mittee with the recommendation that copies of the Inspector's recommendations in regard to improvements at the Fayette County Infirmary and Fayette County Children's Home, be sent to the superintendents of these institutions with a request for an acknowledgement of same and a statement as to what steps would be taken to comply with them.

These recommendations were:

For the Fayette County Infirmary, that an outside privy, which is in bad condition and is not used, be cleaned and filled and the building removed.

For the Fayette County Children's Home, that the outhouses be cleaned, filled and removed, and the inside toilet rooms be used; and that the water supply be run to the hospital building and fixture be connected with the same.

On motion of Dr. Grube, seconded by Dr. Miller, the report and recommendations of the Engineering Committee were approved.

Those voting in the affirmative were Drs. Warner, Hasencamp, Grube and Miller.

In the negative, none.

It was moved by Dr. Hasencamp and seconded by Dr. Grube that the minutes of the Board meeting and the monthly report of the Acting Secretary be sent to the members in advance of each meeting.

Mr. Ray F. Harbert, director of public service, Mr. Phil H. Weber, city engineer, and Mr. John T. Blake, city solicitor, of Canton appeared before the Board and asked that the former action of the Board disapproving plans for proposed sewerage for District No. 4, Canton, be reconsidered and that the city be permitted to install sewers in District No. 4 at the same time that sewage purification works are being built.

On motion of Dr. Grube, seconded by Dr. Hasencamp, the matter was referred to the Engineering Committee for further investigation and report.

Upon request of Dr. Grube, it was decided to hold the next meeting of the Board on the third Thursday of December in Dayton.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube and Miller. In the negative, none.

The Board then adjourned.

Attest:

JAMES E. BAUMAN,
Acting Secretary.

Approved December 20th, 1911.

DECEMBER MEETING

1911

A regular meeting of the State Board of Health was held at the Algonquin Hotel, Dayton, December 20th, 1911, at 8 p. m.

There were present Drs. Warner, Hasencamp, Grube, Sutton and Mr. Hill.

It was moved by Mr. Hill and seconded by Dr. Hasencamp, to approve the minutes of the November meeting.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

Dr. Warner, as chairman of the Executive Committee, presented the following report and recommendations:

1. The President appointed a committee, consisting of Mr. W. H. Dittoe, acting chief engineer, Mr. John W. Hill, engineering committee, Drs. Miller and Warner, members, to make an investigation and report upon the use of chlorine in the purifying of the water of Cleveland, in response to the following resolution:

WHEREAS, By the use of chlorine in the city water many complaints have been received from citizens of Cleveland to the effect that chlorine is both detrimental to health and obnoxious to the taste; and,

WHEREAS, In view of the fact that there is a difference of opinion among the medical fraternity as to the effect of chlorine when used in drinking water; now, therefore,

Be it Resolved, by the Council of the City of Cleveland, State of Ohio, That the clerk of this council be and he is hereby instructed to refer a copy of this resolution to the state board of health, asking them to investigate and report to this council their opinion as to whether the city is following the proper course in the treating of water with chlorine. (Adopted December 11th, 1911).

2. At the last meeting of the Board it was decided to refer the appointment of all health officers serving in lieu of a board of health to the various medical societies for endorsement before approving the applicant. If the Board still wishes to do this it will be necessary to employ additional clerical help, as, with the immense amount of work the present force has all that it can possibly do.

3. In order that there may be no unnecessary delay in submitting the annual report to the Governor, as required by law, it will be necessary to secure extra help. It is recommended that this be left with the President.

On motion of Mr. Hill, seconded by Dr. Sutton, the President and Acting Secretary were authorized to arrange for extra stenographic help in compiling the annual report and in referring the appointments of health officers to the county medical societies for their endorsement.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

4. It is recommended that the Board take up the investigation of the sanitary condition of summer boarding houses, summer resorts, health resorts, etc., with a view to improving them where unsanitary conditions are found; and that the investigation of water and sewage purification plants be continued.

It was moved by Mr. Hill and seconded by Dr. Grube that these investigations be made.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

5. It is recommended that The Page-Adams Annotated Ohio General Code, seven volumes at \$35.00 be purchased for the Secretary's office.

On motion of Mr. Hill, seconded by Dr. Hasencamp, the purchase of this Code was authorized.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

6. Mrs. Grace Champion was employed December 1st, 1911, as stenographer for the state inspector of plumbing and the epidemiologist.

The report of the Finance Committee of expenditures from November 16th, to and including December 15th, 1911, and a statement of balances on December 15, 1911, was, on motion of Mr. Hill, seconded by Dr. Grube, approved.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The report of the Engineering Committee was presented and the various questions were taken up and disposed of in the following order:

It was moved by Dr. Grube and seconded by Dr. Sutton to defer action in the matter of the alleged pollution of Turtle Creek by the sewage of Lebanon until further investigation can be made to determine whether or not a nuisance is caused during a period of dry weather flow in the creek.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

On motion of Mr. Hill the question of proposed sewerage for Oak Harbor, as submitted by Mr. George Champe, consulting engineer, December 7th, 1911, was referred to the Engineering Department for a report at the next meeting of the Board upon the possibility of installing the Imhoff tank for the partial purification of the sewage.

On motion of Dr. Grube, seconded by Dr. Sutton, it was voted to confirm the Board's former action (September 14th, 1911) requiring the village of Cuyahoga Falls to prepare plans for the systematic construction of sanitary sewers, or the interception of sewage from the present sewers with a view to collecting all of the village sewage at one point and there purifying it when necessary; and also prohibiting the use of the North Side sewer, recently constructed, as well as all other illegally installed sewers unless the sewage from such sewers be intercepted in accordance with the plans suggested above.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Hasencamp, it was voted to disapprove the plans for a proposed sewer for the Mills Creek District, Sandusky, submitted by Mr. John Bing, director of public service, on November 22nd, 1911; and to call the attention of the city authorities to the necessity of a comprehensive study of the water supply by an expert sanitary engineer, with a view of securing the supply beyond the influence of the sewage of the city; and also to the danger of increasing the pollution of the bay by the construction of new sewers before the water supply improvements have been made.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The Acting Secretary was instructed to write a letter to the officials of Sandusky asking that the Board be advised within ninety days from this date (December 22nd, 1911) what the city authorities intend to do in devising means to improve the public water supply and to correct present sewerage conditions.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve the plans of a storm water sewer for Croton (Hartford P. O.), already constructed, submitted November 8th, 1911, by Mr. H. L. Maddocks, consulting engineer, upon the following conditions:

- 1st. That the village council immediately pass and file with the State Board of Health an ordinance, prohibiting the discharge of domestic wastes, cesspool overflow, or other putrescible wastes into the sewer, and providing for the removal of any existing connections discharging such wastes into the sewers. This proposed ordinance to be first submitted to the State Board of Health and receive its approval as meeting the provisions of this condition;

2nd. That there be appointed a village official whose duty it shall be to regulate the use of the sewer in accordance with the provisions of the ordinance governing the same; and,

3rd. That before any connection is made to this sewer, for any purpose whatsoever, such connection shall receive the approval of the Secretary of the State Board of Health; and it shall be the duty of the village official provided for in Condition 2, to see that this condition is complied with.

Those voting in the affirmative were Messers. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none

It was moved by Dr. Grube and seconded by Dr. Sutton to approve the proposed change in location of the sewage purification works at Andover, as outlined in a communication from Mr. J. W. Cook, clerk of the board of trustees of public affairs, received December 6th, 1911, which change contemplates the use of the Mack site, so-called, upon the following conditions:

1st. That before any contracts for sewers or sewage purification works are let there be submitted to and approved by the State Board of Health, detailed plans of a plant of the type shown on preliminary plans approved in May, 1910;

2nd. That no connections to the sewers be made prior to the completion of the sewage purification works; and,

3rd. That this approval be void unless contracts for the construction of the sewers and sewage purification works shall have been awarded prior to January 1st, 1913.

Those voting in the affirmative were Messers. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

It was moved by Dr. Hill and seconded by Dr. Sutton to disapprove the plans for sewerage and sewage purification for Main Sewer District No. 1, Lucas County, near Toledo, submitted by Mr. Wm. H. Gould, county sanitary engineer, on November 6th, 1911, and the revised plans for same submitted December 15th, 1911; and to advise the county commissioners that while the general features of the purification works, including sedimentation and filtration through sand were deemed satisfactory, it was considered inadvisable to approve the plans as submitted on account of the proximity of the Toledo water works intake.

Those voting in the affirmative were Messers. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The Acting Secretary was instructed to notify the county commissioners that the details of design must be revised to provide greater facility of operation to secure efficient purification at all times, and also

to advise that in a proposition of this sort the Board deems it necessary and advisable to have the project carefully studied by an engineer of experience in the design and construction of sewage purification works.

On motion of Mr. Hill, seconded by Dr. Sutton, it was voted to adopt a resolution to be sent out where sewers or water supplies are proposed, suggesting to the local authorities the necessity of securing the advice of engineers who are competent through experience to prepare plans and specifications for such work.

It was moved by Dr. Sutton and seconded by Dr. Hasencamp to disapprove the plans of existing and proposed sewerage for Put-in-Bay, submitted by Mr. T. B. Alexander, mayor, September 27th, 1911; the said plans for proposed sewerage consisting of a sewer in Toledo Avenue about 1,200 feet in length discharging into the lake with alternative outlets located at the foot of Toledo Avenue and 125 feet to the eastward

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The Acting Secretary was instructed to notify the authorities at Put-in-Bay that the Board will require that an engineer of experience in sewage disposal be retained to make a study of the sewerage question at Put-in-Bay, this study to embrace the possibilities of carrying the sewage far enough into the lake to be carried away by lake currents, or of disposing of the sewage by some system of sewage purification.

On motion of Mr. Hill, seconded by Dr. Sutton, it was voted to refer the matter of sewage disposal and sewerage for District No. 4, Canton, to Mr. Hartzell, as a committee, to present a written report at the next meeting of the Board.

It was moved by Mr. Hill and seconded by Dr. Grube to approve the requisition of the Engineering Department for filing cabinet and filing supplies.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Hasencamp to approve the monthly report of the acting secretary.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

Dr. Grube, as member of the program committee, presented the program arranged for the January conference with municipal health officers.

The Acting Secretary presented a communication from the secretary of the State Board of Health of Nebraska, inviting the Board to

join in a conference to be held at an early date with the other states of the Middle West, to consider the subject of adopting a uniform system of railroad sanitation.

On motion of Mr. Hill, seconded by Dr. Grube, the Acting Secretary was instructed to notify the secretary of the Nebraska State Board of Health that this Board is prepared to name a committee to attend such a conference as soon as the arrangements for such a meeting have been completed.

A report by the acting chief engineer, Mr. Diutoe, upon approval of proposed residential sewage disposal plants for Mr. Azor Thurston, and Mrs. Anna Davis, at Grand Rapids, Ohio, November 28th, 1911, was presented.

On motion of Dr. Grube, seconded by Dr. Hasencamp, this report was approved.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The acting chief engineer presented a verbal report on the water supply proposed for the village of New Lexington, as outlined in plans prepared by Mr. Wm. McCoy of Zanesville, and submitted March 27th, 1911.

On motion of Mr. Hill, seconded by Dr. Sutton, it was voted to allow the authorities at New Lexington to proceed with the work of installing the water supply, and to instruct the acting chief engineer to present a complete report for action by the Board at its next meeting.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The acting chief engineer presented a verbal report upon the water supply of Dayton.

On motion of Dr. Grube, seconded by Dr. Sutton, the Acting Secretary was instructed to notify the authorities of Dayton that before proceeding further with the improvements in the public water supply they must submit the plans for the entire project to the State Board of Health and receive its approval.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

The board then took up for consideration a communication from H. J. Luff of Cleveland, and the report of the state inspector of plumbing upon this communication.

It was moved by Mr. Hill and seconded by Dr. Grube to lay this matter upon the table until the tests to be made at Urbana, Illinois, are completed, as provided for in a former action of the Board.

Those voting in the affirmative were Messrs. Warner, Hasencamp, Grube, Sutton and Hill.

In the negative, none.

On motion of Dr. Hasencamp, seconded by Dr. Sutton, the state inspector of plumbing and the acting secretary were instructed to take up with the Attorney General matters relating to plumbing which appear in a book published by Mr. Luff.

Mr. Hill presented a communication from the council of the village of Bremen and from Mr. M. A. Daugherty, counse, for the village, asking for a reconsideration of the action of the Board relative to the proposed water supply for Bremen.

The matter was referred to a committee with power to act, the president appointing Mr. Hill and Dr. Sutton, a committee to visit Bremen.

The Acting Secretary was instructed to send to Mr. Hill the office file, containing all papers and reports relating to the Bremen water supply.

The question of approving a regulation adopted by the health officer of Archbold, August Ruibley, serving in lieu of a board of health, forbidding the keeping of hogs within 175 feet of any dwelling in the village, was referred to the Acting Secretary with power to act.

The Board then adjourned to meet in Columbus, the third Wednesday in January, the 17th, 1912.

Attest:

JAMES E. BAUMAN,
Acting Secretary.

Approved January 17th, 1912.

RESUME OF REPORTS PRESENTED TO THE BOARD BY THE SECRETARY

JANUARY MEETING.

(The part of this report referring to work done in 1910 was published in the 1910 Annual Report.)

INFECTIOUS DISEASES.

Smallpox.

Since January 1st, 47 cases of smallpox have been reported, as follows: Ashland 1, Cincinnati 1, Springfield 43, and one each in German Township, Fulton County, and Concord Township, Ross County.

Scarlet Fever.

January 15th, Dr. Laudick was sent to Mendon to settle the diagnosis in a case of scarlet fever. The attending physician had been tardy in reporting the case and the health officer having recently gone into office asked assistance from the State Board of Health.

January 18th, Dr. George Chapman was sent to Custar, Wood County, to settle the diagnosis in a case thought to be scarlet fever. Dr. Chapman saw the case in dispute but did not think it a case of scarlet fever.

WATER SUPPLIES.

The Board has been called upon to make investigations in regard to new or additional water supplies at Amherst, Ironton, and Millersburg, and of the existing supply at Ashland, Gibsonburg, and the Ohio State Sanatorium at Mt. Vernon.

The engineer reported that the village of Ashland is in great need of an auxiliary supply of water for fire protection and that emergency intake should be allowed to continue in place until some more satisfactory supply can be obtained.

Recent investigation at Willoughby showed the same unsatisfactory conditions as on previous inspections, and the attention of the authorities was called to the Board's action of October 19th, 1910, requiring that plans for the improvement of the water supply be submitted.

It will be recalled that the Board at a previous meeting considered certain complaints in regard to the water supply of Wilmington and the chief engineer was instructed to keep the supply under frequent observation with reference to noting any change in the quality of the water.

This has been done and an examination made failed to indicate any change in the quality of the water, analyses of samples showing the water to be of safe quality. The company in proposing to put down new wells in the same territory occupied by their present wells and their action in this respect has been protested against by the local board of health. Mr. J. C. Martin of the water company expects to appear before the Board at this meeting in regard to the additional supply.

Reports have also been made upon the existing supply at Archbold, Gibsonburg, Loveland, and Utica.

SEWERAGE AND SEWAGE PURIFICATION.

Covington, Hilliards, Linden Heights and Ney were visited relative to proposed sewerage. The existing sewage purification plants at Delaware and sewerage at Gibsonburg and Ney were inspected.

January 8th, the chief engineer held a conference with the consulting engineer in reference to sewerage and sewage purification for Bryan.

Reports on filtering material for the plants at Galion and Marble Cliff, and reports on sewerage for Linden Heights and New Philadelphia are to be considered at this meeting.

On recent inspection the plant at Oxford was found to be satisfactory. The authorities were given advice in regard to cleaning the filters.

Since the last meeting, December 28th, 1910, 17 inspections have been made by a representative of the Board and 12 places visited.

OPINION OF THE ATTORNEY GENERAL.

The Attorney General was asked whether or not council can control the compensation of employees of the board of health by refusing to appropriate a sufficient amount of money to cover the compensation of an officer or employee as fixed by the board of health. He held that council cannot decrease such compensation by failure to appropriate a sufficient amount of money and in case this were done a suit in mandamus can be brought to compel council to make the appropriation.

Application has been made to the Post Office Department at Washington for admission of the monthly bulletin to the mails as second class matter. The January bulletin has been prepared and is being printed.

TUBERCULOSIS HOSPITALS.

Your Secretary has had a number of conferences and made some visits in reference to sites and plans for either county or district hospitals for tuberculosis.

The commissioners of Butler County were proposing to convert an old stone building adjacent to the infirmary into a county hospital for

tuberculosis. The Secretary visited Hamilton and strongly advised against this and the matter, it is understood, has been dropped.

A conference was held with Mr. H. O. Wurmser, who has been engaged as architect to design the tuberculosis hospital for Lorain County, since which time he has prepared plans which are to come before the Board for approval.

Dr. W. Coleman and Judge J. M. Bickel, trustees for the district tuberculosis hospital for Darke and Miami counties, consulted the Secretary in regard to plans advisable for such an institution.

January 24th, the Secretary visited the new district tuberculosis hospital near Lima, which is about ready to be opened. Three of the trustees and the architect for the district hospital to be located near Akron, by request, were present at the same time and a conference followed relative to desirable plans for the Akron institution.

MARCH 2ND MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since our January meeting 30 cases of smallpox have been reported. These were distributed as follows: Ashland 1, Columbus 5, Clark County, Springfield Township 4, Cincinnati 3, Dayton 2, Delaware 1, Fulton County, German Township 3, Lorain 2, Montpelier 3, Springfield 4, Ravenna 1, and Troy 1. One death occurred at Springfield.

But one investigation has been made by a medical inspector on account of smallpox, and that at the expense of the local authorities of Montpelier, who requested Dr. George Chapman to come there to investigate an outbreak of smallpox. He reported finding three cases, in two families, all quarantined and under control, and stated that he did not think other cases would occur.

Scarlet Fever.

At the request of the local authorities, Dr. Charles M. Hole, medical inspector at Cleveland, visited New London on the 24th instant, to investigate an outbreak of scarlet fever. He confirmed the diagnosis of scarlet fever and reported that the cases were quarantined and he thought the matter would be properly looked after by the local authorities.

February 26th, the health officer of Gettysburg, Darke County, telegraphed that 10 cases of scarlet fever had occurred in the village during the past month, that many children had been exposed and he had ordered the schools closed. Upon his request, Dr. L. F. Laudick, medical inspector at Lima, went to Gettysburg February 28th, to determine whether the schools could be re-opened with safety.

NEW OR ADDITIONAL WATER SUPPLIES.

Andover, Byesville, Germantown, Lodi, New London and Sugar Creek were visited relative to a proposed new or increased water supply.

Reports have been prepared on water supply for Amherst, East Liverpool, Lowellville, Lodi, Millersburg, Newark, Niles and Toledo.

EXISTING WATER SUPPLIES.

An investigation has been made of the water supply or purification plant at Bradley, Elmore, Greenfield, Loveland, Newark and St. Bernard.

PROPOSED SEWERAGE.

One of the engineers visited Loveland and Fort Recovery relative to proposed sewerage; and reports have been prepared on proposed sewerage for Covington, Coshocton, and Fort Recovery, and sewage purification for Chardon, Bryan, Bucyrus, and Delaware.

Sewage purification plants were inspected by one of the engineers in the following places: Hudson (under construction), Wilberforce University, Ohio Soldiers and Sailors Orphans' Home at Xenia. The existing sewerage systems at Greenfield and at Orrville were also inspected; and the experimental sewage treatment plant at Alliance.

BENSE PROPOSITIONS.

In accordance with the actions taken at the last meeting of the Board the following orders, duly approved by the Governor and the Attorney General have been issued.

Requiring the village of Ada to purify its sewage within five months from the date the Board's order is signed by the Governor and the Attorney General, namely, July 24th, 1911.

Requiring the city of Lima to construct and place in operation a water purification plant, satisfactory to the State Board of Health, by November 1st, 1911.

Requiring the city of Salem to purify its sewage in a manner satisfactory to the State Board of Health, on or before November 1st, 1911.

Requiring the village of Marysville to install and have in operation sewerage and sewage purification works, satisfactory to the State Board of Health, on or before November 1st, 1911.

The order was prepared, requiring the city of Ironton to install and have in operation a water purification plant, satisfactory to the State Board of Health, by November 1st, 1911, but is still in the hands of the Attorney General.

A petition has been received from the board of health of Geneva,

Ashtabula County, asking the Board to investigate the pollution of Cowles Creek by the sewage of the village of Geneva.

The Board has also been asked to investigate the water supply of the city of Defiance, which the board of health of that city alleges is impure and dangerous to health.

CONFERENCES.

February 13th, a conference was held with the architect, Mr. H. O. Wurmser, in regard to the plans for the Lorain County Tuberculosis Hospital.

February 28th, the Secretary visited Steubenville, where he met with the commissioners of Jefferson County, the infirmary directors and the members of the local tuberculosis society in regard to a site for a county tuberculosis hospital.

February 15th, Mr. John P. Bracken, vice-president of the Lowellville Water Company, and Mr. J. Richard Kommer, engineer for the company, held a conference with the secretary and the chief engineer relative to plans for proposed water supply for Lowellville.

February 17th, Mr. C. V. Beatty, director of public service of East Liverpool, and Mr. J. N. Chester of Pittsburg, consulting engineer, held a conference with the Secretary and the chief engineer relative to the proposed water supply for that city.

Twenty-six investigations have been made by some representative of the Board, and 26 different places have been visited.

PLUMBING INSPECTION.

The act governing the inspection of plumbing provides that "Such inspector shall not exercise any authority in municipalities or other political subdivisions wherein ordinances or regulations have been adopted by the proper authorities regulating plumbing or prescribing the character thereof." Accordingly, a letter has been sent to all the cities in the state to determine whether they have any such orders or regulations.

MARCH 18TH MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since the last meeting, March 2nd, 9 cases of smallpox have been reported; 4 in Cleveland, and one each in Delaware; Milford Township, Butler County; Portsmouth; Stryker, Williams County; and Toledo.

March 2nd, Dr. Dick was sent to Delaware, where he found a case of smallpox, properly quarantined. The local authorities purchased a two room wooden house, hauled it out of town, and took care of the patient in this. All exposed persons were vaccinated and no new cases have been reported.

Scarlet Fever.

Upon request of the local authorities, Dr. Dick visited Perry and Washington townships, Franklin County, March 7th, to investigate an outbreak of scarlet fever.

With the health officer of Washington Township and the attending physician, he visited two families in Perry Township with three cases in each, and two families in Washington Township with one case in one family and six cases in the other. All houses were properly quarantined and strict regulations were being observed. Dr. Dick reported that the physicians had the trouble well in hand and he anticipated no serious outbreak.

Typhoid Fever.

March 4th, Dr. Dick was sent to New Concord to investigate an outbreak of typhoid fever. The first case was that of a dairyman's wife, living about a mile east of the village. She had been sick for five weeks and her sons had been selling milk in town. All the cases in the village had been using milk from his dairy. The oldest cases were of about two weeks duration, so the indications are that the source of infection was in the milk.

Dr. Dick visited the dairyman's wife with the attending physician and also three cases in the town. He reported that the sanitary condition of the village is very bad and that sewers are greatly needed. The vaults are nothing more than holes in the ground and are full to running over. The wells are near and in some instances under the houses, mostly dug wells and subject to surface water as well as the underground drainage from vaults.

The sale of the milk from this dairy was stopped and samples of water from a number of the wells were collected for examination in our laboratory. Many of them were found to be polluted. The town needs a general cleaning up. Fortunately the physicians in the village are working together and doing all in their power to check the spread of the disease.

A few days after the visit of Dr. Dick, the president of Muskingum College, located at New Concord, reported that they deemed it wise to dismiss the college ten days before the spring vacation that there might be no undue exposure; the alarming condition being that three cases of typhoid were reported in the family of the proprietor of an ice

cream parlor frequented by the students, the milk for the ice cream having been furnished from the dairy previously referred to.

MIAMI AND ERIE CANAL AT CINCINNATI.

The committee consisting of Mr. Hill, Dr. Hasencamp and Dr. Grube, investigated the canal conditions at Cincinnati and submitted a report embodying the resolution offered by Mr. Hill and adopted at the last meeting, relative to the abandonment of that part of the Miami and Erie Canal within the city of Cincinnati. This was approved by the other members of the Board and submitted to the author of the Bill, Mr. Edward K. Bruce.

INVESTIGATIONS BY COMMITTEES.

The committee consisting of Dr. Sutton and the chief engineer, visited Coshocton on the 10th inst., to investigate proposed sewerage conditions.

The committee consisting of Dr. Hasencamp and the chief engineer, investigated conditions at Toledo on the 16th, relative to the proposed county sewer requested by residents of Copeland Heights and other land holders, together with the county commissioners.

CONFERENCES.

March 9th, Mr. C. C. Connell, solicitor for the village of Lisbon, held a conference with the Secretary and chief engineer in regard to a proposed additional water supply for that village.

On the same date the auditor of Defiance County conferred with the Secretary relative to a site for their district tuberculosis hospital.

March 10th, Dr. Sutton and the chief engineer held a conference with a committee of the chamber of commerce of Zanesville, and again on March 15th, relating to a proposed water supply for that city.

March 13th, the consulting engineer for the village of Centerburg came to Columbus for a conference with the chief engineer concerning proposed water supply for that village; and on the same date the consulting engineer for the village of Fort Recovery held a conference with Mr. Pratt relative to proposed sewerage.

March 15th, one of the commissioners of Lorain County came to Columbus and reviewed the plans for their county tuberculosis hospital with Mr. Shirer, Mr. Reading of the department of workshops and factories, and the Secretary.

NEW OR ADDITIONAL WATER SUPPLIES.

Andover, Bremen, Centerburg, New Carlisle, Lima, Newark and Zanesville have been visited relative to a new or additional water supply; and preliminary, informal reports have been made on proposed

water supply for Germantown, New London and Sugar Creek, and advice given the authorities in regard to the best site for water works.

Report on a recent investigation of the public water supply of St. Bernard shows that the supply wells have changed very little in character, but the chemical determinations indicate that Well No. 2 is still receiving contamination. Although the water at this time is safe for domestic use it is suspicious by virtue of the contamination it is still receiving. The authorities were given advice in regard to preventing water from the surface stratum getting into the lower gravel deposits or into the well and are, it is said, now taking necessary measures to prevent this.

SEWERAGE AND SEWAGE PURIFICATION.

Coshocton was visited relative to proposed sewerage, and Ada and Fostoria in regard to proposed sewerage and sewage purification.

Based upon recent investigation and report by one of the engineers, recommendations have been furnished the authorities of Wilberforce University for better care of their sewage purification plant.

The chief engineer reported that on his recent investigation at Hudson, he found that the construction of the sewage purification plant had progressed in conformity with the plans approved last November; and that the plant is located on a most excellent site.

Complaint was received from the chief chemist at the Columbus filtration plant that the authorities at the Girls' Industrial Home at Delaware were not making the necessary repairs to place the sewage disposal plant in good condition. A complaint of a similar nature had previously been received and referred to the superintendent of the Home, but no action had been taken. The matter was then taken up with a member of the board of trustees residing in Columbus, Mr. Frank C. Hubbard, who promised to look into the matter personally and see that the plant is put in proper condition.

If a joint meeting with the local health authorities of northern Ohio is to be held in June, as usual, some action should be taken at this meeting in regard to the time, place of meeting and program.

Fourteen places have been visited by a representative of the Board and 20 investigations made.

APRIL MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since the last meeting, March 18th, there have been 87 cases of smallpox reported, distributed in the following counties: Clark, Spring-

field, 3; Crawford, Wyandot Township, 1; Darke, Adams Township, 4; Wabash Township 4, and York Township, 1; Hamilton, Cincinnati, 13; Lucas, Toledo, 5; Marion, Marion, 46; Prospect, 1; Monroe, Switzerland Township, 1; Scioto, Clay Township, 1; Valley Township, 4; and Wood, Cygnet, 3.

Several outbreaks of smallpox have been investigated by Dr. Dick. March 21st, the Norfolk and Western Railway Company reported a case of smallpox in a gang of workmen near Portsmouth. Dr. Dick was sent to look into the matter and found a colored man, sick with smallpox in a box car on a side track in Valley Township, Scioto County. Seventeen of the 110 of these workmen had been sleeping in the car with the sick man until the 17th. Several claimed to have been vaccinated but the chances seemed good for more cases. A few men had left the camp and the foreman did not know where they had gone. The company employed a physician, vaccinated all unvaccinated men in camp and has been keeping all under observation and no man has been allowed to leave the camp. But three additional cases have occurred.

March 26th, upon request of the health officer. Dr. Dick was sent to Marion to investigate an outbreak of smallpox, where he found 9 cases. Some cases had recovered. But one house was carded "smallpox," the others being marked "contagious disease." Little attention had been paid to quarantine and the disease had been diagnosed chickenpox. The disease was pronounced smallpox by Dr. Dick and directions were given for handling the outbreak, which were supplemented by instructions from the Secretary's office on Dr. Dick's return. A second visit was requested of the inspector on account of a dispute in diagnosis and to advise with the health authorities about the necessity of closing moving picture shows. The health officer reports that he thinks he now has the disease well in hand. Altogether they have had some 45 cases of mild character and no deaths.

March 29th, upon request of the health authorities, Dr. Dick investigated suspected cases of smallpox at Gettysburg. He found four cases of well marked smallpox which should have been recognized, traceable to the village of North Star, some miles from Gettysburg. Proper directions for handling the disease were given the local authorities and further investigation developed that there had been four cases of smallpox in North Star. No new cases have been reported from either village.

Scarlet Fever.

An inspector was asked to visit Greenspring, Seneca County, on account of a suspected case of scarlet fever which had not been reported or quarantined by the local authorities. Dr. Hole of Cleveland, made the inspection and found several cases of mild type. A board of health

had just been organized and at once took proper steps under the inspector's direction to establish necessary quarantine measures. No further trouble occurred.

TUBERCULOSIS HOSPITAL.

March 23rd, the Secretary inspected a site proposed for the De-fiance County Tuberculosis Hospital; and April 3rd, he attended the opening of the Tuberculosis Hospital near Lima, built by the counties of Allen Auglaize, Mercer, Shelby and Van Wert.

April 17th, the Secretary, with Mr. Shirer of the Board of State Charities, and Mr. Reading of the Department of Workshops and Factories, reviewed the plans for the Lorain County Tuberculosis Hospital.

SEWERAGE AND SEWAGE PURIFICATION.

East Palestine, Elyria, Fostoria, Hilliards, the Muskingum County Children's Home, Piqua, Reading and Urbana were visited in regard to proposed sewerage or sewage purification; and the plants at Ashtabula, College Hill, Oberlin, Orrville, and Wadsworth were inspected.

The inspection of the sewage purification plant at Orrville, made by request, showed it to be in a run-down condition, largely due to neglect. The authorities were notified of necessary changes.

Sometime ago complaint was made of the disposal of sewage at Idora Park, a resort owned by The Youngstown Park and Falls Street Railway Company. An investigation was made by one of the engineers and it was found that the sewage disposal plant was entirely inadequate to properly purify the sewage from as large a population as frequently exists at the park, and the effluent passed into Mill Creek just four miles above the Youngstown water intake. The company was advised that it would be expected to submit to the Board for approval plans for remodeling and enlarging the plant, so that it would properly perform the work required of it. April 15th, the chief engineer of the company wrote that arrangements had been made with the city of Youngstown for pumping the sewage from the park into the city sewer at the city limits at Grace Avenue; the pumping system to be installed within a week or two.

In accordance with instructions, the attention of the authorities at Elyria was called to the fact that the city had failed to take action in regard to fulfilling the condition under which the plans for improved sewerage were approved in 1905, namely, that the sewage purification plant be built within two years; and that the Board would expect that immediate steps be taken toward preparing plans for necessary improvements and submit them to the Board at an early date. They replied that the matter had been under discussion and asked the Board to furnish a list of cities in the state where sewage purification plants are in operation,

in order that a committee might visit them. This information was furnished.

March 21st, upon request, the assistant engineer addressed a meeting of citizens at Shreve in regard to sewerage and sewage purification.

CONFERENCES.

March 30th, the director of public service and city solicitor of Piqua held a conference with the chief engineer relative to proposed additional sewerage; and with the consulting engineer in regard to proposed sewage purification for Kennedy Heights.

April 10th, the chief engineer held a conference with council and the Commercial Club at Fostoria in reference to proposed improved water supply and proposed sewage disposal.

WATER SUPPLIES.

Andover, East Palestine, Fostoria, The Muskingum County Children's Home, New Concord, Oak Harbor, Oxford, Portsmouth and Sugar Creek were visited relative to a new, additional or improved water supply; and the existing plants at Ashtabula, Coshocton and Newark were inspected.

On account of complaints in regard to the Newark supply, additional samples of water were examined which indicated that the water furnished consumers is not entirely safe. It was suggested to the authorities that preliminary tests be made at once, under the direction of an expert in the use of chlorine, to eliminate bacteria. It was pointed out that the three pairs of filter units now in use were not intended to be of sufficient capacity to supply the city and that additional units of the existing type should be installed and thoroughly tried before changing the entire supply.

The authorities at East Palestine were advised to give the proposed additional wells a satisfactory test and then submit a definite plan to the Board.

In fulfillment of the condition under which the filter plans for Waverly were approved, the Roberts Filter Manufacturing Company submitted a report showing the chemical reactions that are expected to take place in the operation of the Waverly filtration plant, and also stating that the iron present in the water will be reduced to one-half part per million and probably less.

As directed, the question of compelling the authorities of Apple Creek to comply with the conditions of the Board's approval in regard to properly protecting the public water supply was referred to the Attorney General, but he has not yet rendered an opinion.

BENSE PROPOSITION.

The order requiring the city of Zanesville to secure a new source of public water supply, or install and place in operation water purification works satisfactory to the State Board of Health to purify the present supply by January 1st, 1912, was approved by the Governor and Attorney General on March 20th, and a copy of the order with letter of transmittal was given to Dr. Sutton on that date, who kindly offered to hand them to the city authorities.

Complaint is again made of the pollution of Jennings Creek by the wastes from The Delphos Manufacturing Company, and the Board asked to make another investigation.

At the last meeting Dr. Sutton was authorized to approve a health officer for the village of New Concord. The mayor appointed Dr. Henry McCreary, who was confirmed by council and approved by Dr. Sutton; and notice of his approval was sent to Dr. McCreary and to the village clerk March 23rd, 1911.

Thirty-two investigations have been made by some representative of the Board, and 27 different places visited.

MAY MEETING.

INFECTIOUS DISEASES.

Smallpox.

Fifty-seven cases of smallpox have been reported since our last meeting, April 19th. These were distributed as follows: Adams County, Liberty Township, 25 cases; Ashland 1, Alger, Hardin County 1, Cleveland 1, Columbus 1, Cincinnati 4, Marion 8, Marion Township, Marion County 1, Prospect 4, and Springfield 10.

April 27th another well marked case was discovered among the gang of men working for the Norfolk and Western Railroad in Valley Township, Scioto County, and Dr. Dick was asked to visit the camp. He went there April 29th. The officials had secured physicians and a number of officers and when the men came in to their dinner they were surrounded by the officers and all vaccinated who could not show evidence of having had smallpox or of having been successfully vaccinated.

No other visits were made on account of a contagious disease.

April 28th, the committee, consisting of Dr. Hasencamp and the chief engineer, inspected Swan Creek and Ten Mile Creek at Toledo.

This committee also held a conference in regard to the progress of the water and sewerage improvements at Lakeside.

May 2nd, the committee, consisting of Dr. Grube and the chief engineer, inspected the sewage disposal plant at Xenia.

May 4th, the chief engineer visited Delphos to look into the present condition of Jenning Creek, which it is alleged is still polluted by the sewage from the plant of the Delphos Manufacturing Company.

April 20th, the assistant engineer went to New Berlin, upon request, to address the citizens on the question of proposed water supply and sewerage.

WATER SUPPLIES.

Bremen, Lakeside, State Hospital for Criminal Insane at Lima, New Berlin, New Carlisle and New Concord were visited in regard to proposed water supply, or purification; and the existing supply at Bellaire, Girard, Minster, Rockford and Struthers was inspected.

The director of public service of Bellaire informs me that an engineer has been employed to prepare plans and specifications to place their filtration plant in operation in accordance with the Board's order, issued under the Bense Act.

The purification plant under construction at Port Clinton was inspected, and it was found that owing to bad weather conditions work had been postponed until May 1st. The site selected for the purification plant is just east of and adjoining the water works pumping station.

Representatives of council and the village engineer of Bremen came to Columbus to confer with our engineering department in regard to proposed water supply for that village.

SEWERAGE AND SEWAGE PURIFICATION.

Pleasant Ridge was visited relative to proposed sewerage and sewage purification; and plants under construction were inspected at Galion, Sebring and the Woodcrest Addition at Youngstown.

The existing sewage purification plant at Mt. Gilead was inspected and it was found to be entirely too small for the work which it is called upon to do. This Board's approval required that the total filtering area of three-fourths acre be constructed by November, 1910. This condition has not been complied with though the authorities are about to make a slight addition to the plant, which when completed will give only about one-half enough filter area. The banks which enclose the filters were not sodded and silt is being carried on to the sand, clogging the filters. In addition the purification of the sewage is being made much more difficult by the large amount of ground water that finds its way into the sewers. The authorities have been informed that the Board will expect them to at once clean the present filters, sod the banks and prevent, in so far as possible, the infiltration of ground water.

While in Xenia, May 2nd, the chief engineer inspected the sewage purification plant at the Ohio Soldiers' and Sailors' Orphans' Home, and found it to be in excellent working condition.

Recent inspection of the sewage purification plant at Wadsworth showed that during wet weather the flow of sewage, owing to the entrance into the sanitary sewers of surface water, was overtaxing the capacity of the plant, which frequently necessitated by-passing the crude sewage to the creek. The plant is operated at its maximum capacity during dry weather flow, and the local authorities were advised that steps should be taken to extend the plant as soon as this could possibly be done.

NUISANCES.

During his visit to Wadsworth the engineer also made a general inspection of the sanitary conditions of the village, in company with the health officer. The unsanitary conditions found to exist were of a local nature and the health officer was furnished a copy of the engineer's report with advice relative to the manner of abating existing nuisances.

An investigation at Bradley, a mining camp of the United States Coal Company, was made, upon request, and very unsanitary conditions surrounding the dwelling houses found. Analyses of samples of the water from three drilled wells furnishing the public supply indicate an improvement in character since the installation of the supply and that it is at present satisfactory from a sanitary point of view. The company was furnished a copy of the engineer's report and the following recommendations, which, it was thought, would render conditions more cleanly and healthful:

1. That all wells other than the public supply well be abandoned at once.
2. That all privy vaults be reconstructed and provided with water-tight receptacles, and be regularly and properly maintained in a cleanly condition.
3. That the keeping of domestic animals in and near the dwelling houses be strictly prohibited.
4. That a vitrified pipe drain be constructed to take the place of the open ditch which runs in front of the lower row of dwellings.
5. That some responsible official be placed in charge of keeping the surroundings at the camp in a good sanitary condition.

BENSE PROPOSITIONS.

A decision adverse to the Board has been handed down by the Circuit Court in the case of the City of Greenville vs. M. G. Demorest, et al. In brief the court holds the entire act to be unconstitutional on the ground that the clause exempting municipalities on the Ohio River

renders the act not of uniform operation and void because of conflict with Section 26, Article 2, of the Ohio Constitution, which provides that all laws of a general nature must have uniform operation over the entire state.

Nineteen places were visited by some representative of the Board. Matters that were acted upon by mail should now be confirmed.

JUNE MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since our last meeting, May 9th-10th, 79 cases of smallpox have been reported, as follows: Adams County, Liberty Township 2; Butler County, Middletown 15; Clark County, Springfield 4; Crawford County, Bucyrus 1; Franklin County, Columbus 6; Hamilton County, Cincinnati 32; Hardin County, Alger 2; Hocking County, Murray City 1; Lawrence County, Ironton 1; Lucas County, Toledo 1; Marion County, Marion 1; Marion Township 1; and Perry County, New Lexington 12. The largest number, 32, was reported in Cincinnati.

May 16th, Dr. Dick went to New Lexington, and with Dr. Wright visited a family in which there were six cases of mild smallpox. The disease was brought home to them by a young man who had been traveling with a show in New York State, the doctor there having diagnosed the case as chicken-pox. Two of the children were taken sick in school, but were not in the eruptive stage. There were many exposures. Dr. Dick met with the mayor and physicians, and all agreed to the diagnosis of smallpox and will do all in their power to stamp out the disease. Proper instructions were given for handling the outbreak.

May 17th, Dr. Dick was called to Marion, where he saw a case of smallpox, the patient being a physician who had been calling his cases chicken-pox.

May 23rd, Dr. Dick visited Murray City and with the health officer saw a young man, with a typical history of smallpox, in the ninth day of eruption. The man had done everything he possibly could to prevent a diagnosis of smallpox by tearing off the tops of the papules. All persons known to have been exposed were vaccinated and kept under observation. The authorities were given instructions and the board of education was urged to make vaccination of school children compulsory before school opens in the fall, which they agreed to do.

May 29th, a member of the board of health of Westerville called at the office and reported an outbreak of disease there, believed to be small-

pox, but not reported by the physicians. Dr. Dick was sent to Westerville that afternoon and saw a college student in the twelfth day of eruption, a typical case of discrete smallpox, diagnosed chicken-pox and not reported. The attending physician had had about twenty cases of the same kind. He stated that he was sorry he had made the mistake and in the future would comply with the wishes of the State Board of Health.

Dr. Dick called upon a member of the board of health, a grocer, and found that he, his wife and two children had all recovered from the same disease. A conference was held with the members of the board of health and they were told to employ a physician, quarantine and vaccinate until they had stamped out the disease.

They employed Dr. Smith to look after the cases; to hunt up all exposed persons and to get the names and addresses of all such to vaccinate and keep under observation. He was also instructed to hunt up all recovered cases and fumigate the houses where such patients had been.

Dr. Smith called on the Secretary May 31st and was given full instructions in regard to handling the outbreak. He was particularly charged to insist upon the vaccination of all the college students who show no evidence of having been previously vaccinated, or who have not had smallpox.

The disease has been quite mild and, as usual in the present epidemic, has not been easily communicated.

May 31st, upon request, Dr. Dick met with the faculty of the college. On that night the board of health reorganized and appointed Dr. Smith as health officer.

Scarlet Fever.

Upon request, Dr. Dick was sent to the Girls' Industrial Home at Delaware on May 12th, and with Dr. Wiley made an inspection and reported that up to the time of his visit they had had two cases of scarlet fever, one completely recovered, fumigated and released. The second case was then twelve days old. It was properly isolated and every possible precaution was being taken by the physician and the head nurse to guard against any further spread of the disease.

Typhoid Fever.

They have also had two cases of typhoid fever at the Girls' Industrial Home; two girls who had been there five or six weeks and there seemed to be no doubt that the disease was contracted at the institution. These cases were isolated and everything about the patients thoroughly sterilized before being taken from their room.

Other cases of typhoid will probably occur if the girls continue to drink the Scioto River water, as some do not liking the spring water on account of its sulphur taste.

Pellagra.

A case of supposed pellagra was reported by Dr. B. G. McCurley of Courtland, Trumbull County. The patient had not been away from home. A description of the case was sent to Dr. Corlett of Cleveland, who is an authority on this disease, but he replied that while the case presented the symptoms of pellagra he was unwilling to make a diagnosis upon a written description.

May 17th, the committee, Dr. Hasencamp and the chief engineer, visited Sandusky to investigate the water purification plant, and the committee has a report to present.

May 18th, the committee, Dr. Miller and the chief engineer, investigated the pollution of Morgan's Run in Cleveland, and has a report to present.

TUBERCULOSIS HOSPITALS.

May 25th, upon request of the commissioners, the Secretary inspected a site near Bucyrus which it is proposed for a county tuberculosis hospital for Crawford County.

The prosecuting attorney of Darke County has filed suit in the Common Pleas Court in that county, asking for injunction proceedings against the trustees of the Darke-Miami District Tuberculosis Hospital, praying for an injunction against the building of the hospital, and also questioning the constitutionality of the act providing for the district hospitals.

BENSE PROPOSITIONS.

You have been informed of the action of the Circuit Court in holding the Bense Act unconstitutional. May 31st an appeal was filed in the Supreme Court and the Attorney General will ask to have the case advanced and hopes that it can be heard during the September term. He still believes that the act is constitutional. This is also the opinion of Mr. Smith Bennett, former special counsel in the office of the Attorney General, who aided in the preparation of the act.

The following petitions have been received under this act:

Complaint from the board of health of Columbus, in regard to the pollution of the Scioto River by sewage and other wastes from Marion, Kenton, Prospect, Marysville and Magnetic Springs.

Complain from the trustees of Center Township, Williams County, of the pollution of a stream in the township by sewage and other wastes from the Bryan Fertilizer Factory.

Complaint from the trustees of Clinton Township, Fulton County, of the pollution of Turkey Foot Creek by sewage and other wastes from the village of Wauseon; and,

Complaint from the trustees of York Township, Fulton County, of the pollution of Turkey Foot Creek by sewage and other wastes from the Van Camp Packing Company and the village of Wauseon.

Complaint has also been made against the sewage disposal plant at Canton and of the pollution of the St. Marys River in Salem Township, Auglaize County.

The Governor and the Attorney General decided to delay action in the Ironton case until the proposed changes in the present water works system can be perfected and tried.

May 16th the council of Lima appropriated a small amount of money for the purpose of installing a temporary water disinfection plant, in accordance with the Board's advice, and the director of public service asked our chief engineer for suggestions.

PUBLIC WATER SUPPLIES.

Alliance, Cambridge, New Carlisle, New Concord, the Muskingum County Children's Home and Utica were visited in regard to proposed or additional water supply; and the existing plants at Athens, Corning, London, Malta, Springfield and Sandusky were inspected.

Upon recent inspection of the improvements being made in the public water supply of Coshocton samples were collected from the Walhonding and Tuscarawas rivers and from the public water supply. The public water supply was excellent from a sanitary standpoint, though the total hardness was somewhat higher than that of the rivers.

The report on a recent inspection at Fort Recovery revealed the fact that the conditions of approval of the public water supply in 1900 have never been carried out. The wells are poorly located from a sanitary standpoint and the water, while safe at present, is very hard and contains a large amount of iron. The water works pumping station equipment is badly worn, new boilers and new pumping machinery being badly needed. In view of the poor condition of the pumping station, the unfavorable location of the wells and the fact that the water is objectionable on account of its iron and hardness, the authorities were advised to seek a new location outside of the village.

SEWERAGE AND SEWAGE PURIFICATION.

Byesville, the Greene County Children's Home, the Greene County Infirmary, Gibsonburg, Lakewood, the Muskingum County Children's Home and Washington Court House, were visited relative to proposed sewerage or sewage purification; and the existing plants at the Girls' Industrial Home, Delaware; Grandview Heights, London, Marble Cliff, and the experimental sewage plant at Alliance, were inspected.

Upon recent inspection of the sewage purification plant in process of construction at Sebring, it was found that no work had been done since last December.

Upon inspection of the sewage purification plant under construction at Galion it was found that a part of the concrete work in the dosing chamber was carried on during freezing weather and as a result it will be necessary to tear out all of the siphon walls and reconstruct this part of the work. Several cracks were also observed in the concrete walls separating the contact beds. The work is being pushed as rapidly as possible and it is hoped to place the plant in operation by August 1st, 1911.

It was found, upon a recent visit to Woodcrest, a real estate addition to the city of Youngstown, that the sewers had been completed but no work had been done on the sewage purification plant, due to the fact that the real estate company had gone into bankruptcy and the addition sold. At the present time legal action has been taken to force the construction of the plant.

NUISANCES.

Nuisances have been investigated at Hartford, Croton P. O., and Millbury, Wood County, and will be reported upon later.

The Attorney General has given an opinion to the effect that the state plumbing inspector has no jurisdiction in municipalities where they have already adopted ordinances or resolutions regulating plumbing or prescribing the character thereof; whether or not they are being enforced.

At the last meeting of the Board Dr. Warner and the Secretary were appointed a committee, with power to act, to consider the rules and regulations adopted by the health officer of Lowellville, Mr. Porter Watson, serving in lieu of a board of health.

The committee approved the rules and regulations and the action should now be confirmed.

A sample of the sand to be used in the filters at Camp Wise was submitted by the consulting engineer May 29th, in compliance with condition No. 2 of the Board's approval given May 10th, and was approved by the chief engineer.

Since the last meeting, 35 places have been visited and 39 inspections made by some representative of the Board.

JULY MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since our last meeting, June 1st, 95 cases of smallpox have been reported, as follows: Ashtabula County, Conneaut, 3; Brown County, Clark Township, 4; Clark County, Springfield, 17; Clermont County,

Bethel, 3; Defiance County, Ney, 1; Hamilton County, Cincinnati, 12; Franklin County, Columbus, 10; Westerville, 30; Geauga County, Burton, 2; Licking County, Johnstown, 1; Lorain County, Lorain, 3; Lucas County, Toledo, 5; Pickaway County, Circleville, 1; Derby, 2; and Sandusky County, Gibsonburg, 1. There is no serious outbreak at the present time.

But two investigations have been made by medical inspectors.

June 21st, Dr. Dick was sent to Derby, Pickaway County, where he found two well marked cases of smallpox in a family of five, none of whom had been vaccinated. There had been a number of exposures, most of them, however, open air exposures. Our inspector met a member of the board of health and the health officer and was assured that his instructions would be carried out. It was thought the case was contracted at St. Anthony's Hospital, Columbus.

June 23rd, Dr. Hegner was sent to Yankeetown, Brown County, there being a difference of opinion among the physicians as to the diagnosis. He found four cases of smallpox in one family and a number of other cases in the convalescent stage or fully recovered. While there, Dr. Hegner learned that they were having smallpox among shoe factory employes at Bethel, and stopped there to hold a conference with the mayor. He recommended that all the employes of the factory be vaccinated; and proper instructions were sent to the health officer for handling the outbreak.

CONFERENCES.

Conferences have been held with the consulting engineers or with representatives from the following cities: Ashland in regard to the extension of their sewage purification works; Bellefontaine relative to filtering material to be used in the sewage purification plant under construction; Port Clinton and Lakeside relative to water purification; Portsmouth in regard to proposed infiltration system; and New Lexington in regard to proposed water supply.

BENSE PROPOSITIONS.

Complaints under the Bense Act have been investigated at Bryan, Geneva and Wauseon.

PUBLIC WATER SUPPLIES.

Proposed or additional water supplies were investigated at Alliance, Dayton, Jefferson, Lakeside, Lisbon, Lodi, Lorain, Minster, New Lexington, New London, Oak Harbor, Shawnee, Somerset, Swanton and Wooster.

Existing supplies were inspected at Camp Perry, Canton, Circleville, Franklin, Galion, Lakeside, Madisonville, Mansfield, Marion, Miamisburg, Monroeville, Murray City, Pleasant Hill, Sandusky, Struthers, Vermilion, Washington C. H., Wilmington and Youngstown.

Lima and Youngstown were visited relative to the use of bleaching powder in the purification works.

At a previous meeting of the Board the chief engineer was instructed to keep the water supply of Wilmington under frequent observation with reference to noting any change in the quality of the water. This was intended as a precautionary measure until the water works management could obtain a more suitable source of supply. On June 7th, one of the engineers visited Wilmington and collected samples from the supply wells. Analyses of these show the water to be safe for domestic use, though the iron content which precipitates iron rust, causes an objectionable turbidity and color. Except for the increase in the iron content in these samples the results of the analyses failed to indicate any material change from those previously collected.

The examination of the public water supply of Madisonville showed the water to be safe, though still influenced by unsanitary conditions pointed out in a former report, existing in the negro settlement to the south of the wells. The mayor and council were advised that these conditions should be remedied as soon as possible not only in order to protect the public water supply but to protect the general health of the community; and that if the village is soon to be annexed to the city of Cincinnati, it would be well to connect with the city water supply system as soon as possible.

During the recent inspection of the filtration plant at Youngstown it was learned that the plant is at times overworked owing to the great increase in the water supply since its installation. The attention of the director of public service was called to the necessity of either increasing the capacity of the plant, or providing an additional storage reservoir for the filtered water, and that both improvements would be desirable. He replied that the matter was under discussion and plans were being prepared for a storage reservoir for filtered water; that they expected to build two 25,000,000 gallon basins on a high point, and also another large standpipe on the south side of the city. The estimated cost of the proposed improvements approximates \$3,000,000, and when completed will probably meet the requirements of the city for the next ten or fifteen years.

Recent investigation showed the water supply of Struthers to be excellent from all standpoints except the bacterial content. The possible advantage of using bleaching powder, in minute quantities, to eliminate dangerous bacteria was suggested to the water company.

The water from the new reservoir at the headwaters of Yellow Creek was shown to be unsuitable to introduce into the public supply and the company was advised to drain the water outside of the watershed until the reservoir has been cleaned and the workmen have left the vicinity.

It was also found that nothing is being done to protect the watershed, a requirement in the conditions of the Board's approval of the water supply in 1905 and the mayor and council were urged to pass an ordinance to this end, and replied that the matter would be taken up at their next meeting.

Analytical results, physically, chemically and bacterially, showed the water from a flowing well located about 30 feet south of the south dam at the new reservoir, proposed as a storage supply, to be of suitable quality for domestic and drinking purposes.

Recent inspection of the public water supply at Malta showed that objectionable surface drainage had been diverted from the public supply wells by means of a vitrified pipe sewer, but that a small swale northwest of the wells still receives considerable barnyard drainage and is used for hogs. The authorities were advised that this endangers the supply through possible seepage through the ground and that the swale should be properly drained. The results of analyses of the public water supply indicate that the water is at present entirely satisfactory from a sanitary point of view, though containing considerable hardness and a slight amount of iron.

Complaint was made of the unsanitary condition of the public water supply of Rockford and one of the engineers visited the village and made an investigation and report. Analyses of the public supply showed that the water is satisfactory from a sanitary point of view, but that it contains a large amount of iron and is exceedingly hard. The two public supply wells do not yield an adequate supply to permit of proper flushing of the distribution system at all times and the local officials were advised that they should secure a sufficient supply of water for the needs of the village, including proper flushing of the distributing system, by providing one or more additional drilled wells. Also that measures should be taken to improve the circulation in the mains by eliminating, if possible, all dead ends, and the mains should be thoroughly cleaned and maintain in a cleanly condition by frequent and adequate flushing.

SEWERAGE AND SEWAGE PURIFICATION.

One of the engineers visited Deshler to investigate proposed change in a sewer outlet; Cleveland, relative to sewage disposal for a school building at South Euclid; Kent and Brier Hill (Youngstown), in regard to sewage disposal for the railroad shops of the Erie Railroad located at these places; and Pleasant Grove, a new addition to Youngstown relative to proposed sewerage and sewage disposal.

The plants under construction were visited at Alliance, Bellefontaine, Covington and Kent; and the existing plants were inspected at Camp Perry, Girl's Industrial Home at Delaware, Jefferson, Madison Home at Madison, Mansfield, Orrville, Westerville, Xenia and the O. S. & S. O. Home at Xenia.

Filtering material for the sewage disposal plant at Warrensville (Cleveland Infirmary), was approved by the chief engineer on June 24th, 1911, in compliance with Condition 1 of the Board's approval of the plans given December 3rd, 1910.

Filtering material for use in the sewage disposal plant for Bellefontaine was approved by the chief engineer July 5th, 1911, in compliance with Condition 3 of the Board's approval of the plans June 30th, 1910.

Filtering material submitted by the Lake Erie Cement and Construction Company of Huron, for use in the sewage filters at North Amherst was approved by the chief engineer July 14th, 1911, in compliance with Condition 2 of the Board's approval of June 29th, 1910.

NUISANCES.

The health officer of Mentor requested an investigation of the pollution of a small stream by wastes from the plant of the Mentor Knitting Mills Company. One of the engineers visited Mentor June 14th, and in company with the health officer and other local officials made an investigation. He reported that conditions indicate that the wastes from the mills, periodically, at least, render the stream unfit for use; that the concentrated wastes from the cleaning and bleaching processes being the greatest cause of this, their discharge into the stream should be discontinued as well as the unpurified sewage from the building. A copy of the engineer's report was furnished the health officer, and it was suggested that they first eliminate the strongest of the wastes from the main drain and dispose of them in some other way, presumably by spreading upon land, and when this has been done another investigation would be made and advice given in regard to making other improvements that may be necessary.

Complaint was made of a nuisance at Croton, Licking County, caused by the discharge of wastes from the cream separating plant of The C. O. Wells Company into an open ditch in the southwestern part of the village. One of the engineers made an investigation and found there was just cause for complaint, as the wastes are of a highly objectionable character and create a decided nuisance. The sections empowering the local board of health to abate this nuisance were cited and the health officer was informed that the Board would collect samples and make necessary analyses to determine required facts concerning the character of the wastes if the owners of the creamery would install a plant to purify the wastes before discharging them into the ditch. He was also advised that all house connections to sewers and drains for the discharge of sanitary wastes should be disconnected, but the pond into which the wastes are being discharged should be drained and an outlet secured for the pond and for the storm water drains into the small wet weather stream east of the village.

In May two petitions were received, one from thirty-eight citizens of Carbon Hill, the other from fifty-four citizens of Longstreth, small villages in Ward Township, Hocking County. The Board's assistance was asked in securing the abatement of a nuisance, caused by a pond of stagnant water located on the right of way or property, of the Hocking Valley Railroad Company, which was formerly drained by an open ditch. Slack had been piled along the course of the ditch, the washings from which kept the ditch filled, so that this source of outlet for the pond is impracticable.

The pits are excavated to a depth of 4 or 5 feet and owing to the fact that the local topography is extremely level it is impossible to drain them into any natural drainage system and wells have been drilled and cased to depth of 200 feet, which takes most of the water from the pits. The water supply of the village is from private wells, drilled to a depth of from 50 to 65 feet, penetrating only the upper portions of the limestone.

Upon investigation by one of the engineers it was found that the sanitary conditions of these villages would be greatly improved if adequate drainage facilities were afforded the low land lying north of the railroad. The company and the trustees of the township, constituting the board of health, desired a new outlet but were refused an outlet through private property. The question was referred to the Attorney General, who advised that the trustees should order the nuisance abated, under Section 4420; and that the railroad company, under Section 8759 of the General Code, had the right to appropriate or condemn private property for the purpose of furnishing an outlet for this stagnant water. A copy of the engineer's report and also the opinion of the Attorney General was furnished the township health officer.

The special report on collection and disposal of city wastes, authorized about two years ago, has been completed and is ready for the printer.

Since the last meeting seventy-two inspections have been made and fifty-eight places have been visited by a representative of the Board.

The Board will be interested in the recent decision of the Ohio Supreme Court, holding that that part of the vital statistics law requiring a report of births is unconstitutional.

Your Secretary attended the Conference of the State Boards of Health with the Surgeon General of the Public Health and Marine Hospital Service in San Francisco; and also the Conferences of the State and Provincial Boards of Health of North America held in Los Angeles. The meeting in San Francisco was largely devoted to the discussion of

the plague situation in California. While only one case of plague has occurred in a human being during the past year the Federal, State and local health authorities are still actively engaged in the examination of rats and squirrels, some of which are still found to be infected with plague.

A committee was appointed, of which your Secretary was made Chairman, to arrange for a joint meeting of railway authorities with Federal and State health authorities for the discussion of various health conditions affecting travel.

SEPTEMBER MEETING.

(No report was read at the August meeting.)

INFECTIOUS DISEASES.

Smallpox.

Since July 19th, but twenty-three cases of smallpox have been reported. There were, 7 in Cincinnati, 2 in Toledo, 2 in Lorain, 3 in Darby Township, Pickaway County, and 9 in Frankfort, Ross County.

Upon request, Dr. Dick visited Piqua, where he diagnosed the case impetigo. This was the only inspection made by a medical inspector.

The epidemic of smallpox at Marion in the spring cost that city \$1,650.

Diphtheria.

July 23rd, the epidemiologist went to Canal Dover to investigate an outbreak of diphtheria in the Tuscarawas County Children's Home. His report may be found on a subsequent page.

Typhoid Fever.

August 23rd, the epidemiologist investigated typhoid conditions at Portage, a village of some 500 inhabitants about three miles from Bowling Green. His report may be found on a subsequent page.

Upon request of the health officer, the epidemiologist is now making an investigation of a typhoid fever outbreak at Newark.

PLUMBING INSPECTIONS.

The state inspector of plumbing inspected the following institutions and made recommendations for needed improvements in the plumbing of same: Longview Hospital; the Hamilton County Infirmary; the O. S. and S. O. Home at Xenia; the Greene County Children's Home; the Greene County Infirmary; the Madison County Infirmary; the Madison County Children's Home; Wilberforce College; the Warren County

Infirmary; the Crawford County Infirmary; the Wyandot County Infirmary; the Marion County Infirmary; the Marion County Children's Home; the Champaign County Children's Home; the Champaign County Infirmary; the Miami County Children's Home and the Miami County Infirmary.

BENSE PROPOSITIONS.

One of the engineers recently visited Geneva and inspected Cowles Creek, about which complaint was made under the Bense Act some time ago. The condition of the creek was found to be such that no complaints of a nuisance should be made, and the health authorities stated that they were satisfied with present conditions.

The trustees of Emerald Township, Paulding County, have asked the Board to investigate the pollution of Flatrock Creek by the German American Sugar Company of Paulding.

The trustees of Shawnee Township, Allen County, have asked the Board to investigate the pollution of the Ottawa River (Hog Creek) by the sewage from the city of Lima.

PUBLIC WATER SUPPLIES.

July 28th, the special committee, Dr. Warner, Mr. Hill and the chief engineer, visited Portsmouth to investigate the proposed water supply, and report was made and acted upon at the August meeting.

Proposed or additional water supplies were investigated by one of the engineers at Bremen, Coshocton, Lodi, Logan, Malvern, Newark, Oak Harbor, Payne, Portsmouth, Richwood, Waverly and Wilmington.

Reports on the proposed supply for Bremen, Malvern, Payne and Wilmington have been prepared for consideration at this meeting.

Existing water supplies were inspected at Canton, Camp Perry, Coshocton, Gallipolis, Lakeside, Lewisburg, Lima, Middleport, Spencer-ville and West Manchester; and the water purification construction work at Lorain and Niles was inspected.

The chlorine chemical purification plant at Cleveland was inspected and Lima was also visited relative to the experimental disinfection of the water supply.

A report has been made on the existing water supply of Canton, and the authorities advised that the water obtained from Nimishillen Creek through the race leading to the pumping station is not safe for domestic purposes and should not be used; and also that duplicate machinery is greatly needed.

Results from examination of samples of water from the new wells constructed at Coshocton to be used as an additional supply indicate an excellent water and one that is at present safe for domestic use.

The report on a recent examination of the existing water supply at Jefferson shows that the water as delivered to the consumers is a wholesome water of satisfactory sanitary quality.

The examination of the existing water supply of Lewisburg indicates a supply that is at present safe for domestic and drinking purposes. The authorities were advised that it would probably be necessary to frequently flush the elevated tank and mains to clean them of the iron deposit.

The existing water supply of Marion has been reported upon and the examination shows a safe water but hard and there is sufficient iron in the water to stain plumbing fixtures.

Upon request of the health officer several private wells were examined, which were found to be safe from a sanitary standpoint, but it was suggested that they be protected from contamination by improving surrounding conditions.

The examination of the existing water supply of Monroeville indicates a water unsafe for a public water supply unless previously purified. The water is obtained from the Huron River and delivered to the consumers without purification. Upon request of the health officer two private wells were also examined. They were found to be polluted and to have been the probable cause of cases of typhoid fever in the families using the wells.

The results of the examination of the water supply of West Manchester show an excessive amount of iron, though after passing through the reservoir and distribution system the amount of iron is greatly decreased.

The results of the examination of the existing supply of Vermilion shows the filter to be producing a water of excellent sanitary quality. The raw water was not seriously polluted, so that the purification required of the filter was not great.

SEWERAGE AND SEWAGE PURIFICATION.

Ada, Akron (Kenmore), Bucyrus, Canton, Canal Fulton, Delaware, Hudson and Wilmington were visited in regard to proposed sewerage; and the existing plants at the Girls' Industrial Home at Delaware, Camp Perry, Elyria, Marble Cliff and Oberlin were inspected.

Report have been prepared for consideration at this meeting on sewerage for Ada, Canton (District No. 4), Canal Fulton, Hudson and West Lafayette, and upon the existing sewerage conditions at Cuyahoga Falls.

Condition 1 of the Board's approval of plans for sewage purification for Bellefontaine (June 30th, 1910) provided that two acres of intermittent sand filters be substituted for final treatment by broad irrigation unless it was amply demonstrated, to the satisfaction of the

August 18th, the chief engineer investigated unsanitary conditions character for this purpose. Upon investigation, the engineer reports that the use of the natural land area for filtration of the contact filter effluent appears feasible according to results of the experiments conducted. Ultimately the use of sand filters will probably be required, although for a few years the sewage flow will be low enough to permit of the use of the land area as a final treatment. (Cold weather conditions were not considered.)

The sewage disposal plant at Jefferson has been constructed and is ready for use as soon as the sewers are finished.

The sewage disposal plant at the Ashtabula County Court House at Jefferson was found to be not operated continuously and the sewage is by-passed into a small stream, tributary to Mill Creek, contaminating the water and giving rise to foul odors. The plant should be kept in operation until connection can be made with the village plant, when the county plant could be abandoned.

It was found, upon inspection, that the attendant at the sewage purification plant at Marble Cliff did not sufficiently understand the operation of the plant, and the attention of the authorities was called to the third condition of the Board's approval of the plans requiring a proper attendant, and council appointed a new man to look after the plant.

Investigation of complaints of nuisances arising from the sewage purification plant at Westerville revealed the fact that the alterations in the plant recommended to the authorities last year had not been carried out. The attention of the mayor and council was again called to certain necessary repairs that should be made at once to improve the plant and it was urged that more careful attention be given the plant.

Recent inspection of the sewage purification plant at the Madison Home showed the plant to be in excellent condition and operating satisfactorily.

NUISANCES.

At the request of the secretary of the board of health of Cleveland, the chief engineer made an inspection of the conditions affecting bathing at Euclid Beach Park and Beulah Park, and his report may be found on a subsequent page.

The health officer of Deshler asked the Board to investigate numerous complaints of the unsanitary condition of Brush Creek, a small stream passing through the village. The sewerage conditions at Deshler had been recently investigated by one of the engineers and inspection at Brush Creek had shown very unsanitary conditions due to the effluent from certain sewers. As the village has an ordinance forbidding the use of the sewers for carrying sanitary wastes other than from the hotel buildings, the health officer was advised to investigate all houses

in the village now having access to these sewers for the discharge of sanitary wastes, either directly or by cesspool overflows, and require that these connections be removed.

Complaint was made of the unsanitary conditions at Rye Beach, a resort southeast of Sandusky on Lake Erie. August 5th, one of the engineers made an investigation. The park covers a wooded area of about forty acres on which are located thirty-eight cottages, a small hotel and dancing pavilion, all of which accommodate about 325 people. A report was made and furnished the proprietor, the conclusions of which were:

That the water supply at Rye Beach, obtained from dug wells, is likely to be influenced by nearby leaching privy vaults, and these vaults should therefore be cleaned out and made watertight;

That the infiltration trench leading to the westerly well should be completely cut off from the well;

That garbage should be stored in closed receptacles, and should be collected at least three times a week and the contents disposed of in a suitable manner; and

That the chicken yard on the west side should be discontinued and placed in a sanitary condition.

The mayor of Groveport asked the Board's assistance in securing the abatement of a nuisance which, upon investigation on August 7th was found to be due to the improper use of a storm sewer. He was advised that the only way the unsanitary conditions existing could be remedied was by the disconnection of all house connections, thereby preventing creamery wastes, cesspool overflows and wash water reaching the sewer.

August 8th, one of the engineers visited Richwood to investigate a nuisance of which complaint was made. He found that several years ago Union County constructed a tile ditch through the village extending to an open ditch about three-fourths of a mile east of the village and that since the ditch was constructed several of the inhabitants, without authority, had tapped the same and allowed cesspool overflows, sink drains, wash water and bath room wastes to be discharged into it. The ditch was found to be in a filthy condition. It is constructed of ordinary farm tile laid with open joints which allows the sewage pollution to permeate the soil. During the summer the village has paved several streets and in order to care for the storm water, about 1600 feet of 20-inch vitrified sewer has been constructed. This village drains into the public water supply of Columbus, and it is important that no sewage be discharged into the storm sewers. A letter was sent to the mayor, calling attention to the fact that storm sewers had been recently installed without the approval of the State Board of Health, as required by law, and asking that plans showing these new sewers be submitted.

August 18th, the chief engineer investigated unsanitary conditions existing at Buckeye Lake. A report was made and furnished the State Board of Public Works, calling attention to unsanitary conditions along the northerly shore of the lake which are inimical to health; and it was also recommended that the swale which contains stagnant water be filled in and that regulations be strictly enforced regarding the disposal of garbage and the construction and maintenance of privy vaults.

August 21st, upon request, the pollution of a spring at Lewisburg was investigated by one of the engineers. It was found that the storm-water sewers were receiving bath and sink wastes and cesspool overflows and that the sewers discharge into an open ditch in the outlying districts, thereby creating a nuisance, and one of the sewers was polluting the spring in question. A report was furnished in which it was stated that all sanitary fixtures and cesspool overflows should be disconnected from the sewers; the storm sewer discharging near the spring into an open ditch should be constructed of vitrified sewer pipe a distance of at least 150 feet farther east so that all storm water will be conducted past the spring. It was also stated that with the installation of water works and the increased use of sanitary plumbing, it is evident that a system of sanitary sewers is badly needed.

Seventy-seven inspections have been made by a representative of the Board, and fifty-two places visited.

The rules and regulations adopted by W. C. Sharp, health officer of Leesville (Leesburg P. O.), which were referred to the Secretary were approved on August 1st, 1911.

In compliance with the first condition of the Board's approval July 19th, 1911, of the plans for storm water sewers for Miamisburg, council on August 2nd, 1911, adopted an ordinance regulating the use of these sewers and filed a copy with the Board.

In compliance with the second condition of the Board's approval, August 10th, 1911, of the iron removal plant to be used to treat the water from the new 8-inch well at Hiram, samples of filtering material were submitted and approved by the chief engineer September 8th, 1911.

OCTOBER MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since the September meeting but six cases of smallpox have been reported, five in Lima which were imported from Fargo, North Dakota, and one in Cincinnati.

September 21st, upon request, Dr. Hole was sent to Hartsgrove Township, Ashtabula County, where he found a case of eruptive skin disease, not smallpox.

Diphtheria.

October 9th, the epidemiologist was sent to Roseville on account of diphtheria. His report may be found on a subsequent page.

October 13th, upon request of one of the attending physicians, Dr. Laudick was sent to Cridersville. He confirmed the diagnosis of diphtheria. There had been eight cases and one death, and one physician was treating several cases of tonsilitis. Proper instructions were given and, in order to be on the safe side, Dr. Laudick advised that all cases of sore throat be regarded as dangerous until proven otherwise.

October 13th, the epidemiologist investigated an outbreak of diphtheria at Jerry City, a village of about 500 inhabitants in Wood County. His report may be found on a subsequent page.

Typhoid Fever.

The epidemiologist has made the following investigations of typhoid fever outbreaks, his reports of which may be found on subsequent pages.

September 11th, at the request of the health officer, he visited Newark, where they had reported 55 cases since August 27th.

September 17th, upon the request of the health officer of Cincinnati, he visited Glendale, where they have five cases including one death from typhoid.

September 25th, the chief engineer, on request of the local board of health, went to Willoughby to attend a meeting of the board of health, council and citizens, to consider the typhoid situation, and on the 28th, upon further request of the board of health, the epidemiologist visited Willoughby. His report may be found on a subsequent page.

October 5th, upon request of two physicians, the epidemiologist visited New Athens, Harrison County. There were fifteen cases of typhoid fever, one a physician of the village.

October 7th, upon request of one of the physicians, the epidemiologist visited Stafford, Monroe County, to investigate an outbreak of typhoid. He found six cases in the village and three in the vicinity.

September 27th, Dr. Ford of Cleveland reported ten cases of typhoid fever in that city believed to have been contracted at Silver Lake, a resort in Summit County. Later the manager of the resort asked the Board to investigate the sanitary conditions and one of the engineers was sent there for that purpose.

A request for information in regard to typhoid fever possibly traceable to Silver Lake was sent to the health authorities in the neighborhood. Akron reported that they had no cases in that city that could be traced to Silver Lake. Cuyahoga Falls reported three cases that could

possibly be traced there, two of these having been employed at the resort. Kent reported no cases traceable to Silver Lake, and the health officer of Stowe Township, in which the lake is located, reported that in August there were three cases of typhoid fever, one of the owners of the resort, another the wife of one of the owners, and the third a young woman employed there. A private examination of the water used is said to have shown no pollution. Five other cases occurred in different parts of the township but none of these can be traced to the lake.

Upon investigation the sewerage facilities at the lake were found to be excellent; the water supply from the Lodge well satisfactory; but water from the spring on the Chautauqua grounds showed the presence of sewage pollution. This seemed to be the only source that could have contributed to typhoid fever directly traced to Silver Lake.

A report was made and furnished the manager of the park and he was advised that the water for fire protection should under no circumstances be left accessible for drinking or cooking even though the people were warned; that the discharge of sewage into the Cuyahoga River in an unpurified state is contrary to law and should be discontinued, and a plant should be installed to purify the sewage before next season and approved by the State Board of Health.

PLUMBING INSPECTIONS.

The state inspector of plumbing visited Cleveland to confer with the company having the contract for the plumbing in the city's institution at Warrensville; and also met with the master plumbers of Cleveland to consider with them the provisions of the new State Building Code relating to plumbing.

BENSE PROPOSITIONS.

In accordance with the Board's instructions, the chief engineer made an investigation and report upon the pollution of the Columbus water supply by the sewage from Marion, Kenton, Prospect, Marysville and Magnetic Springs, in response to the petition received from the board of health of Columbus. By direction of the chairman of the executive committee a copy of this report was sent to the superintendent of the water works of Columbus, and the director of public service of Marion was advised that their sewage purification plant is overworked and inadequate and he was urged to take immediate steps toward improving the same.

The health officer of Green Camp had also complained of pollution of the Little Scioto River by the sewage of Marion, and he was notified of the results of the investigation and the instructions given the Marion authorities.

One of the engineers visited Lima to inspect the experimental chlorine treatment of the public water supply, and Paulding to investigate the complaint that the German American Sugar Company is polluting Big Flatrock Creek.

The trustees of Turtle Creek Township, Warren County, have asked the Board to investigate the pollution of Turtle Creek by the sewage and other wastes from the village of Lebanon.

PUBLIC WATER SUPPLIES.

Proposed or additional water supplies were investigated by one of the engineers at Albany, Bremen, New Berlin, Oak Harbor, New London and Payne.

The chief engineer visited Bremen, made an investigation and attended a special meeting of council, in order to locate a feasible source of water supply, and his report was submitted to the engineering committee in accordance with instructions given at the last meeting of the Board.

It will be recalled that in September, 1910, the city of Newark was granted temporary use of the new public water supply obtained from infiltration wells in a gravel bar in the north fork of the Licking River until data could be obtained to determine the satisfactory quality of the water. From a report recently made by our engineering department it is learned that the city has not improved its water supply along lines to determine the possibility of securing water of a satisfactory quality and in sufficient quantity from infiltration wells; that the present provision is inadequate to furnish conclusive evidence as to the merits of the system. This evidence can be obtained only after sufficient infiltration units have been installed to permit their proper operation at all times. The water consumption data emphasizes the necessity of providing additional units. The authorities were furnished a copy of the report and urged to take immediate steps to install additional strainers, of the same type as those already installed.

The existing water supply was inspected at Camp Perry, the Ohio School for the Blind at Columbus, Elmore, Fredericktown, Marion, Mansfield, Mt. Sterling, the Ohio State Sanatorium at Mt. Vernon, and Sandusky; and the water purification plant under construction at Port Clinton.

The examination of the water supply at Circleville indicates that the water from the filter gallery is of excellent quality from a sanitary point of view as the ground water supplying the filter gallery has not diminished in quantity and is probably of much better quality than could be secured from the bar in the creek. The authorities were advised that it would be advisable for the water company to secure the proposed additional supply by improving and enlarging the existing filter gallery.

Complaint was made that on account of the scarcity of water it was believed that the water works company at Galion was pumping water from Whetstone Creek direct. Investigation proved that this complaint was uncalled for, that the water is from the wells and analyses indicated that the supply is at present satisfactory from a sanitary standpoint but has a high iron content and an objectionable turbidity.

The public water supply of Gallipolis was found to be satisfactory from a sanitary standpoint and suitable for a public supply. The water from the infiltration system is of somewhat different character from the river water, being higher in alkalinity and lower in chlorine, indicating the presence of some ground water probably due to the low stage of the river. Present samples are also different from those analyzed in 1906 and 1907, which would seem to indicate that the character of the supply is being affected by the change in the shape of the bar in the vicinity of the wells.

Upon recent inspection of the public water supply at Miamisburg it was found that the passage through the ground deposits has purified the water before reaching the wells to a degree that may be considered safe at the present time, but that the wells are subject to polluting influences.

Upon recent investigation of the public water supply of Murray City it was found that the water is at present safe from a sanitary standpoint but that the conditions surrounding the wells are very unsatisfactory and there is danger of the water becoming polluted at any time. The authorities were advised that several vaults in the vicinity of the wells should be removed, or provided with watertight receptacles, and that the ditch which provides surface drainage for the western part of the village should be diverted from the wells.

SEWERAGE AND SEWAGE PURIFICATION.

Albany, Beachland, Brewster, Canton, Cuyahoga Falls, Kensington Addition (Columbus), Mantua, New Berlin, Piqua and the Muskingum County Children's Home were visited in regard to proposed sewerage or sewage purification; the existing plants at Ada, Camp Perry, Galion, Lima, Mansfield, the Ohio State Sanatorium at Mt. Vernon, Newark, and the plant under construction at Hudson, were inspected. Reports have been prepared for presentation at this meeting on Beachland and Canton.

Upon request of the president of the board of trustees of the State Normal School for northwestern Ohio, one of the engineers inspected sewerage conditions at Bowling Green and reported as follows:

1st. The present system of disposing of the sewage of the city is inadequate and improper and additional sewage from the normal school would make worse the conditions which have for so long a time been a source of complaint.

2nd. The proximity of the proposed state site to the existing outlets and polluted ditches would make the location undesirable from a health standpoint.

3rd. In order to provide proper sewerage for the city and for the proposed state property, the city should collect all of its sewage at one point, removed from habitation and there purify it.

4th. In order to properly accomodate the normal school, the city should extend its sewer system to the boundary of the proposed state property, and should also provide necessary pumping facilities for lifting into the city sewers, the sewage from that portion of said property which is too low to drain by gravity into said sewers.

A report has been made upon the experimental sewage purification plant at Alliance, constructed in order to comply with the conditions of the Board's approval of plans for the new sewage purification plant and operated for a period of fourteen months, during which time the plant was visited several times by one of the engineers. The results of the experimental work have proven satisfactory to the consulting engineer and the city officials, and fine locomotive cinders are being placed in the new filtration plant for the filtering material.

One of the engineers visited Kenmore, a village one-half mile southwest of Akron, to investigate local conditions relative to proposed sewage disposal. A plan was submitted but was not thought by the chief engineer to be practicable and the authorities were advised to secure the services of a competent engineer to prepare plans for a suitable purification plant through which all the sewage should be passed before being discharged into an open ditch or watercourse.

Recent inspection of the sewage purification plant just completed at Galion was made and it was found that the flow of sewage amounted to 80,000 or 90,000 gallon per day, which is very much less than the capacity of the plant. For this reason two or three filters will be cut out until the flow of sewage is increased. The effluent from the one filter was odorless and clear. It is the intention of the city engineer to take charge of the operation of the plant during the coming year.

Upon recent inspection the plant at the O. S. and S. O. Home at Xenia was found to be operating efficiently but the sewage flow was in excess of the normal capacity of the plant. A copy of the report was furnished the superintendent and he was advised to look into the question of the possible seepage of ground water or the waste of water in the buildings and correct this so that the plant may not be operated continuously with an overload which will cause deterioration and in a short time produce an unsuitable effluent.

It was found on inspection of the sewage purification plant at Orrville that the fundamental principles in the operation of the plant are being more closely adhered to, as a result of a more intelligent understanding of the automatic feeding and discharging apparatus.

On a recent visit to Delaware it was learned that in all probability nothing will be done on the new sewage disposal plant at Delaware until after the November election, when new officers will take office. The delay has been caused by the owner of the site wanting the city to buy thirty acres while the city wants but ten.

NUISANCES.

A complaint was received from some eighty citizens of Cleveland living in the vicinity of 105th street. One of the engineers made an investigation and found that a sewer which was originally built by the village of Glenville as a sanitary sewer is now being used as a combined sewer and receives storm water, and the flooding the sewer by contaminated water is a distinct menace to health. It was learned that the public service department is fully cognizant of the existing condition and is making improvements as fast as finances will permit. One relief sewer has been built and others will be made available during the coming year.

The director of public service was urged to take every step possible toward completing the construction of all necessary relief sewers at the earliest time possible.

The Board was asked to investigate a nuisance at Oakwood, a village of 500 inhabitants in the eastern portion of Paulding County. One of the engineers made an inspection and report, a copy of which was furnished the complainant and the local authorities. It was found that the nuisance is caused by the discharge of a storm sewer into an open ditch. It was stated by two members of council that no sanitary connections exist and that the only known source of pollution is the wastes from a small cider mill. The fact that the nuisance is observed during the spring and early summer, when the cider mill is not in operation, would seem to point to some other source of pollution and the local authorities were advised to locate definitely any connections to the sewer and to improve the condition of the sewer and open ditch by continuing the sewer to the Auglaize River, which would be most desirable, or by digging the ditch deeper and keeping it clean to allow more rapid flow to the river.

The board of health of Clinton Township, Franklin County, complained of a nuisance caused by a tomato seeding plant of the Livingston Seed Company, northwest of the city of Columbus. One of the engineers made an investigation and report. It was found that a decided nuisance is caused by the discharge of the wastes from this plant into an excavated pond 80 by 30 by $3\frac{1}{2}$ feet deep, just north of the plant. This becomes almost filled with solid matter each season and very offensive odors are given off. A copy of the report was furnished the complainants and the seed company, and the latter was notified that in order to avoid legal proceedings it would be desirable to make certain

improvements in the handling of the wastes; that they should engage the services of a competent engineer to devise proper means of disposal and these should be installed before the spring of 1912. Also that the plans for same should be submitted to and receive the approval of the State Board of Health.

OPINIONS OF THE ATTORNEY GENERAL.

The Attorney General has given the following opinions in regard to questions submitted to him:

Can the State Board of Health issue a permit for the location of cesspools upon information furnished by local health authorities?

He holds that the Board can adopt requirements for the construction and location of cesspools and delegate to the local authorities the power to inspect the same and certify to the State Board of Health that the requirements have been complied with, and the Board may issue a written permission to construct the same.

Can the State Board of Health remove an inefficient health officer by withdrawing its approval of such appointment?

He holds that the appointing power has no authority to revoke its appointment once completed and acted upon, nor can the State Board revoke its approval once made and promulgated.

a. Can a local board of health abate a nuisance on State property, at Lewiston Reservoir (Indian Lake) or Licking Reservoir (Buckeye Lake).

b. Can the State Board of Health adopt general rules and regulations governing such matters as the location, construction and cleaning of vaults, the disposal of garbage, house drainage, etc., for households living on State property?

He holds that the local board of health in the townships in which said reservoirs are located may make such orders and regulations as it may deem necessary for * * * abatement or suppression of nuisances.

Also, in case of the neglect of the local board to abate such nuisances, the State Board of Health has the power and authority to take action and secure the abatement of the nuisance.

Can the State or local health authorities require that a highway be treated with oil or other substances to prevent a dust nuisance?

They cannot.

Can the trustees of a district tuberculosis hospital establish a rule or regulation by which they can control patients, who are in indigent circumstances and who are admitted without having been confined in the infirmary, by keeping them in the institution for a sufficient length of time to determine if they will be benefited by the hospital treatment and until discharged by the board of trustees?

He holds that the trustees can only adopt regulations regarding their conduct while in the institution, and cannot compel them to remain in the institution.

Did the passage of the Ohio State Building Code extend the authority of jurisdiction of the state inspector of plumbing.

It did not.

Is it necessary for a municipality to adopt and advertise the State Building Code?

No. It is only necessary to publish additions which it may make to the State Code.

He also holds that the State Board of Health has no jurisdiction in enforcing the Ohio State Building Code where they have a building or health department.

The special counsel in the Attorney General's Department states that a request was received from an attorney representing the corporation of Put-in-Bay for an opinion as to the jurisdiction of the State Board of Health where new sewers are to be constructed in an old sewer district and a new outlet is contemplated. The attorney was informally advised that it was the opinion of the Attorney General's department that such a sewer would come under the provisions of the law requiring the Board's approval of a sewerage system.

In compliance with the third condition of the Board's approval of August 10th, 1911, the village of Pleasant Ridge, on September 20th, 1911, adopted an ordinance (852) providing for the appointment of a superintendent of the sewer system and sewage disposal works, and a copy has been filed with the Board.

In compliance with condition 1. of the Board's approval of August 10th, 1911, the council of Hilliards on September 11th, 1911, adopted an ordinance prohibiting the installation of any pipe or drain for the purpose of connecting the interior of any house or cellar with any of the village sewers.

Fifty inspections have been made by a representative of the Board and thirty-eight places visited.

NOVEMBER MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since the last meeting, fifty cases of smallpox have been reported. Forty-seven of these were in Defiance, 2 in Cincinnati and 1 in McConnelssville.

At the request of the health officer, the epidemiologist visited Defiance on November 7th to look into the methods used in the prevention and restriction of smallpox and to advise in regard to closing the schools. His report may be found on a subsequent page.

Diphtheria and Scarlet Fever.

November 10th, at the request of the health officer, Dr. Heinlein went to Marietta where they were having some complaint in regard to the quarantine of cases of diphtheria as enforced by the health officer. Dr. Heinlein reported that very complete quarantine was being enforced, with day and night guards; that cats and dogs were not allowed to enter or leave the premises, and immunizing doses of antitoxin were being given to all exposed persons. There have been 26 cases and 7 deaths from the disease.

October 25th and 26th, the epidemiologist visited Portsmouth to investigate a report of a large number of cases of diphtheria and scarlet fever. His report may be found on a subsequent page.

Infantile Paralysis.

November 3rd and 4th, the epidemiologist visited Cincinnati for the purpose of learning the methods used in combatting the epidemic of infantile paralysis in that city. Since September 1st, 83 cases had been reported, the majority of these having occurred since September 23rd. His report may be found on a subsequent page.

Typhoid Fever.

On October 25th, the assistant engineer visited Springfield to confer with the health officer and the superintendent of water works in regard to the prevalence of typhoid fever. During the summer of 1911 some thirty to forty cases occurred. While the health officer was of the opinion that the majority of these cases received their infection outside of the city, there were several cases in which infection is known to have occurred within the city and the source is a problem. The health officer looked upon the water supply as a possible source and steps are being taken to prepare plans for a new supply. There were 11 cases among the employes of the International Harvester Company, and all used city water. Upon investigation, however, it was learned that there is a system for fire protection from Buck Creek connected to the service system from the city mains and a leaky valve at the connection would admit of pollution entering the drinking water. It appears to be important to ascertain whether or not the public water supply is responsible for the typhoid cases and the epidemiologist will make a further investigation.

STATE INSPECTOR OF PLUMBING.

The state inspector of plumbing has made an inspection of the plumbing in the following places: The Governor's Office, Columbus; Knights of Pythias Club House and Hall at Washington, C. H.; and the Fayette County Children's Home and Fayette County Infirmary, at

Washington, C. H., and his reports have been sent to the Engineering Committee for consideration and report.

He has inspected the plans and recommended changes in school buildings at Ironton, Steubenville and Chillicothe.

The inspector also visited Dayton to explain the sanitary features of the State Building Code to the master plumbers.

Arrangements have been made for the printing of 10,000 copies of the part of the State Building Code relating to plumbing in book form for distribution. The law becomes effective August 15th, and all plumbing work (outside of cities having a local inspector and that in private residences) should be inspected and tested in the presence of the State inspector of plumbing.

The delay in printing the code has necessitated many letters explaining the various sections and considerable time taken which might otherwise have been spent in making inspections.

Pencil sketches and specifications for a series of tests to be conducted by Professor James White, of the University of Illinois, have been prepared and the tests will be made as soon as arrangements can be completed.

In accordance with instructions, a communication was sent to Dr. W. O. Thompson, President of the State University, in regard to conducting a series of tests at that Institution; but no response has been received up to this time.

BENSE PROPOSITIONS.

October 19th, a petition was received from George Cooper, clerk of Union Township, Warren County, asking the Board to investigate the pollution of Turtle Creek by the wastes from the village of Lebanon. A similar complaint having been received before the last Board meeting and referred to the engineering department for investigation and report, this petition was also referred to that department.

October 25th, a communication was received from Senator Kuhl, complaining of the condition of Mill Creek. After consulting with Mr. Hill and the Attorney General, Mr. Kuhl was informed that unless the Bense Act is upheld in the Supreme Court the State Board of Health can do nothing. As there are so many and varied interests to be taken into consideration, it was suggested that those affected invite action by the local boards of health, the city and village councils and the county commissioners, appealing to the State Board of Health to take such action as is possible looking to the abatement of the pollution of Mill Creek.

PUBLIC WATER SUPPLIES.

Proposed or additional water supplies have been investigated by one of the engineers at Bremen, Cleveland, Croton, Lodi and Magnolia.

Existing water supplies have been examined by one of the engineers at Barberton, Oxford, Nelsonville, Springfield and Wellington.

A report has been made on the existing water supply of Elmore which shows that efforts have been made to comply with the conditions of the Board's approval. Abandoned wells have been filled with concrete and houses required to make connections for the discharge of sanitary wastes wherever sewers are accessible. It was learned, however, that it is proposed to connect with the system for storage purposes and use in case of fire an abandoned cistern formerly used for fire protection. The attention of the authorities was called to the danger of contamination by surface drainage and they were advised to enlarge the existing reservoir on the water works property, thus insuring watertight storage and providing circulation of the water.

Recent analyses of samples of water from Kостoria show that the water is not entirely satisfactory as to quality. There is no evidence of sewage contamination and nothing to indicate that the use of the water was the cause of typhoid fever which occurred in the city. The results indicate that the water filtration plant is not capable of producing a satisfactory water.

A report has been furnished the health officer of Middleport upon a recent examination of the public water supply, which showed that the water taken from the distribution system is fairly satisfactory from a sanitary point of view, but contains a large amount of iron. There has been considerable complaint among the users on account of the excessive turbidity. This objectionable feature is caused by the irregular operation of the filter plant, especially in regard to the feeding of the coagulant and also by the excessive rate at which the filters are operated.

The health officer at Mt. Sterling wrote that complaints were made of the presence of suspended matter and small white worms in the public water supply. Bacterial examination of the water indicated a satisfactory quality and it was thought that the worms reach the water by means of the walls or roof of the collecting reservoir. The reservoir has not been cleaned for a number of years and is in a poor state of repair. An informal report was furnished the health officer and he was advised that the collecting reservoir should be cleaned and repaired, or an entirely new one constructed, and in case the present reservoir is repaired provision should be made for direct pumping from the wells. It was suggested that he take the matter up with the mayor and council and urge that steps be taken in the near future to correct the trouble.

A report was made on the existing water supply of Sandusky and a copy furnished the city engineer. The frequent presence of colon bacilli in the distribution system is unsatisfactory, indicating the necessity of careful and intelligent operation of the filter plant at all times, especially as the plant is being operated to the limit of its capacity. The urgency of making the extensions and repairs contemplated was pointed out.

An informal report was made on the progress of construction of the water purification plant at Port Clinton, in which it is stated that several changes have been made in the plans approved by the Board in 1910; one change being the omission of the clear water basin. The attention of the authorities was called to the fact that any change or omission from the approved plans should be submitted to the State Board of Health.

Upon a recent visit to Camp Perry one of the engineers found the sewage and water purification plants in good condition. The soldiers had left and the season closed and arrangements were made to drain the sewage and the sand filters of both the water and sewage purification plants and to rake and scrape the beds before abandoning them for the winter.

October 25th, the health officer of Nelsonville asked to have the public water supply examined on account of typhoid fever. One of the engineers went to Nelsonville and collected samples of the public water supply and from a well at the Nelsonville Brick Company's plant. The results of analyses indicate these waters to be of excellent quality from a sanitary point of view and satisfactory for domestic use.

A report has been prepared for action by the Board upon a proposed water supply for the village of Albany, and on proposed change of source of water supply for Lodi.

SEWERAGE AND SEWAGE PURIFICATION.

Croton, Euclid Beach Park, Cleveland, and Pleasant Hill were visited in regard to proposed sewerage; the existing plants at Eaton and Marble Cliff, Green County Children's Home, Green County Infirmary and the O. S. and S. O. Home at Xenia and Wilberforce University; and the purification plants under construction at Amherst and Bellefontaine were inspected by one of the engineers.

Reports have been prepared for action of the Board on proposed sewerage for Pleasant Hill, sewage purification for Wilmington and sewerage and sewage disposal for Kensington Addition at Columbus.

NUISANCES.

October 30th, a petition was received from the residents of Elkton, asking the State Board of Health to assist them in securing relief from a nuisance caused by a stagnant pond. One of the engineers visited Elkton and made a report, stating that in his opinion no serious nuisance exists at the present time and that the matter is one to be dealt with by the local authorities, who are advised to proceed under Section 4420 and require the persons responsible for the nuisance to abate it.

Since the last meeting of the Board 26 places have been visited and 32 inspections made by a representative of the Board.

OPINIONS OF THE ATTORNEY GENERAL.

It will be recalled that some time ago the Board withheld its approval of the proposed water supply for Oxford until the authorities secured the removal of a drain from a privy on private property, which is a menace to one of the supply wells. The owner of the property refused to remove the drain and the matter was referred to the Attorney General. He has just rendered an opinion in which he holds that the board of health can abate and remove the nuisance (the drain) following the procedure set forth in Section 4420 et seq.

Last May the Attorney General was asked whether the village of Leipsic could be compelled to enforce an ordinance prohibiting the use of a storm sewer for domestic purposes as a means of abating the nuisance in Hickey ditch at Leipsic caused by the discharge of domestic wastes into a storm sewer emptying into the ditch. He has given an opinion to the effect that the only authority this Board would have would be under Section 1249 et. seq., and advised that no action be taken until the constitutionality of the Bense Act has been determined by the Supreme Court.

It will be recalled that the Board in 1905 approved a water supply for the village of Struthers upon certain conditions, the first of which was that the board of trustees of public affairs should adopt rules and regulations for the protection of the purity of the water in the proposed reservoir. Upon inspection it was found that little or no attention had been given this matter and it was therefore taken up with the Attorney General.

The Attorney General holds that the village, having contracted with a private water company should provide a board of trustees of public affairs, whose duty it would be to adopt rules and regulations for the protection of the quality of the public water supply and likewise to prevent contamination of the source of thereof as contemplated in Section 12784. He states that there is no provision in the Code granting authority to private water companies to police the watershed from which its supply is secured, but the jurisdiction of a municipal corporation to enforce the provisions of Sections 12784 would rest in the board of trustees of public affairs and that board would have authority to prosecute under said section. He, however, sees no legal objection to a private company, at its own expense, protecting its water supply from contamination or pollution by an individual or individuals.

In accordance with instructions, forms to be used in itemizing expense accounts have been prepared and distributed to members and employees.

The question of printing the special report on "A Study of the Collection and Disposal of City Wastes in Ohio" was taken up with the Supervisor of Public Printing and an arrangement made to have the report printed as a supplement to the Twenty-fifth Annual Report

(1910) now in press. This will insure the printing of the report several months sooner than if printed separately or as a part of the Twenty-sixth Annual Report (1911). One thousand copies of the special report were ordered and the only expense to the Board will be for illustrations and the binding of a small number to be used for exchanges and special purposes.

Mr. Van Buskirk, of the engineering department, has been detailed on the work of the investigation of the pollution of the Great Lakes.

October 27th, the chief engineer approved the sand submitted October 10th, 1911, from the Killbuck Sand and Gravel Company for use in the filters at Shreve. This sand was submitted in compliance with Condition 2 of the Board's approval of plans for sewerage and sewage disposal for Shreve, July 19th, 1911.

DECEMBER MEETING.

INFECTIOUS DISEASES.

Smallpox.

Since the November meeting 108 cases of smallpox have been reported in eight counties. These were Ashtabula 1, Defiance 65, Franklin 2, Hamilton 16, Licking 2, Lucas 1, Marion 4, Morgan 8, and Ottawa 9. Forty-six of these were in the city of Defiance. The case at Conneaut, Ashtabula County, was imported from Texas.

A number of investigations have been made by a representative of the Board.

November 21st, Dr. True of McConnelsville reported smallpox and asked the Board to send an inspector. Dr. Sutton being unable to go and a medical inspector not being available, Dr. Brush of Zanesville was sent to McConnelsville. He found a young man who had been working in Cincinnati and had come to his home October 28th and went among his friends. He had a noticeable rash upon his face which one physician had diagnosed as "Cuban itch." He returned to his work October 30th, but feeling ill his employer sent him home to remain until well. He arrived home November 2nd and his malady was pronounced smallpox. In the house lived a brother, a school teacher and two young girl boarders. They were all vaccinated. The brother took smallpox and also developed a vaccination sore, the scab remaining after the smallpox scabs had been rubbed or had fallen off. The vaccination took in the case of the teacher and the older girl. The youngest girl's vaccination did not take and she had a most pronounced case of smallpox. Dr. Brush saw several other cases and held a meeting with

the mayor, board of health, board of education and other interested citizens. General vaccination was urged and the powers of the local board of health were discussed. The schools were closed and the only apparent need in McConnelsville to stamp out the disease was a hearty compliance with regulations and support of the local authorities.

November 20th Dr. Hegner went to Norwood to see a case of supposed chicken-pox. He found a severe case of smallpox in a woman who had contracted the disease from a workman putting cement in the cellar of her house and who said he had been suffering with chicken-pox and was not quite well. Later a woman at Hyde Park, who had been attending the Norwood woman, contracted the disease and there was a difference of opinion among the physicians as to the nature of the malady. This occasioned Dr. Hegner's visit. Quarantine was established and instructions given in regard to fumigating after recovery of the patients.

November 26th, Dr. Ingrahm reported a case of smallpox at Bono, Jerusalem Township, Lucas County, and asked that a medical inspector be sent as there had been one family in which all members of the family had the disease but the father. There had been a general exposure and the authorities were slow to act. The people being skeptical, mingled freely with the people of Toledo. The authorities were given full instructions in regard to quarantine and disinfection.

November 27th, the health officer of Tiffin Township, Defiance County, reported a case of smallpox at Evansport. The eruption had appeared a week previous but the nature of the disease was not known until the patient was seen by Dr. Cameron of Jewell. There had been a very general exposure. The health officer was urged to insist upon general vaccination and to have the board of health employ a physician to keep under observation all persons known to have been exposed to the disease. A letter was sent to the health officer and the board of health of all townships in and surrounding Defiance County with printed instructions in regard to dealing with smallpox. Notices were posted prohibiting public gatherings and all persons exposed to smallpox were ordered vaccinated.

December 26th, Dr. Wiant, president of the board of health of Marion, reported cases of smallpox in townships adjoining Marion and asked that a medical inspector be sent. The epidemiologist visited Pleasant Township, Marion County, where he found a case of discrete smallpox in a young man. His report may be found on a subsequent page.

Diphtheria.

December 13th, Dr. Sutton requested Dr. Geyer of Zanesville to investigate an outbreak of diphtheria at Belle Valley, a small mining town having a population made up mostly of foreigners. The health officer had reported 19 cases and three deaths. Dr. Geyer found that diph-

theria began the early part of September, the first case being a young lady visitor from Athens County, who had a sore throat when she arrived. Shortly after a little boy across the street contracted the disease and the physician called pronounced it a mild case and told the parent of the boy to report the case to the health authorities, which he did not do for several days and no quarantine was established. A few days later a girl in the same house with the first case contracted diphtheria. She refused to have antitoxin administered but recovered. The quarantine in this case was very lax and another case occurred in the same house, the father and mother attending a reception while the child was ill. Another child in the neighborhood contracted diphtheria. Thirteen thousand units of antitoxin were administered but the child died. Since that time the quarantine regulations were more strictly carried out. In the same family a child (having had whooping cough for six weeks) contracted sore throat. Two physicians were called but were not sure what kind of sore throat it was and later said the throat was clearing up. A few days later the child died and the death certificate was signed "Indigestion and weak heart superinduced by whooping cough." A public funeral was held and the body was taken to Pleasant City for burial. The next day a brother was taken sick and a physician called but the child died before he arrived. No funeral was held and the body was taken to Pleasant City at night. Dr. Geyer found but one case at the present time. Most of the cases had been among the foreigners. The health officer was given instructions and it is believed a strict quarantine will be enforced.

December 27th, a telegram was received from Bridgeport stating that there was a case of diphtheria in a Syrian family and the nurse had been quarantined and was unable to get something to eat. Our medical inspector at Bridgeport, Dr. Heinlein, was communicated with and he stated that the matter had already been called to his attention and he found that this nurse was going to a restaurant for her meals and he had at once given instructions that she should be quarantined and provided with all the necessities of life.

Scarlet Fever.

November 18th, at the request of the health officer, Dr. Warner visited Granville to investigate an outbreak of scarlet fever due to exposure to cases which had occurred in the country sometime previous and which were not properly quarantined. Children came to school in Granville from homes in which the disease had prevailed. The school and Sunday schools were closed. Dr. Warner gave instructions to the health authorities and recommended that wherever possible a physician be appointed health officer in villages and townships. The health officer and the board of education were commended for the prompt measures taken to stamp out the disease.

Complaints were made that scarlet fever was prevailing in and around Harveysburg, Warren County, and quarantine measures were not being enforced, there being a dispute as to the nature of the disease. Dr. Grube went to Harveysburg on December 11th, confirmed the diagnosis of scarlet fever, and impressed upon the doubtful the importance of accepting this diagnosis and enforcing proper measures to prevent any further spread of the disease.

December 16th, Dr. Boudreau went to Georgesville, a number of complaints having been made that scarlet fever had been present in a certain house and proper quarantine and disinfection had not been carried out by the health authorities. His report may be found on a subsequent page.

Request was made that an inspector be sent to Greenwich, where scarlet fever had been prevailing for some time. The epidemiologist went to Greenwich December 30th, and his report may be found on a subsequent page.

Typhoid Fever.

The health officer of Xenia telephoned that they were having cases of typhoid fever in town and asked the Board to make an investigation. The epidemiologist visited Xenia November 20th, and his report may be found on a subsequent page.

November 21st, the epidemiologist visited Springfield to continue the investigation of typhoid fever cases to determine to what extent, if any, the public water supply was responsible for the disease. His report may be found on a subsequent page.

Infantile Paralysis.

December 27th, the epidemiologist went to Cleveland to investigate an outbreak of poliomyelitis. His report may be found on a subsequent page.

INSPECTION OF ICE SUPPLY.

The health authorities of Green Springs asked the Board to examine a pond used to supply ice to the village. One of the engineers visited Green Springs, inspected the surroundings and found the pond to be in an unsanitary condition owing to the presence of decaying wood and other organic matter in the pond, and to the possibility of surface drainage from a barnyard and several dwellings nearby. The engineer reported that the water flowing into the pond from sub-soil drainage tile should be satisfactory for an ice supply, but the contamination arising from the sources above mentioned should be removed. The authorities were advised that in order to place the pond in the best possible condition it should be cleaned of all sediment and deepened to at least four feet, cleaning and sodding the banks and elevating them to a sufficient

height to permit of the construction of diverting ditches to prevent the inflow of surface wash. Also that before filling the pond in the fall of each year, particular attention should be given to the removal of any accumulated filth in the bottom of the pond.

STATE INSPECTOR OF PLUMBING.

The state inspector of plumbing visited the infirmary and the children's home at Urbana, to instruct the superintendent and plumber in regard to carrying out orders issued to them for bettering the sanitary conditions at these institutions; and Greenfield to advise the owner of the Elliott Hotel in regard to remodeling the house.

He has prepared reports and an explanatory letter which have been sent to each member of the Board and the Engineering Committee for report.

BENSE PROPOSITION.

No petitions have been received under the Bense Act. The complaint of the pollution of Turtle Creek by the sewage of Lebanon was investigated and a report thereon is to be presented at this meeting.

PUBLIC WATER SUPPLIES.

Proposed water supplies for Navarre and New London have been investigated; the existing supplies at Painesville and South Euclid; and the purification plants at Ashtabula and Port Clinton were examined.

An examination of the site proposed for the location of the public water supply wells at Navarre, in the northwestern portion of the village between the Tuscarawas River and the Ohio Canal immediately north of Third Street indicated undesirable surface surroundings, a number of dwellings being in close proximity. It was also thought that it would be submerged in time of floods. The authorities were advised that a site much more promising as to surface surroundings might be secured 800 to 1,000 feet west of the Tuscarawas River and immediately north of the West Lebanon Road. No test wells have as yet been drilled to determine the quality of the water.

Upon request of the consulting engineer, a report was made upon two sites proposed for the public water supply for Magnolia; one at the Magnolia bank and the other in the valley of Big Sandy Creek. Analyses of samples of water from drilled wells showed the water from drilled wells showed the water from both sources to be of a high degree of purity and free from organic contamination.

December 6th, the president of the council of Albany conferred with the acting chief engineer in regard to a proposed water supply for that village, plans for which were disapproved at the last meeting of the Board. The conditions of the disapproval were explained by the

engineer, after which the president of council expressed the intention of employing a competent engineer to survey the project of the proposed supply and submit new plans, probably in the spring.

A report has been made upon the existing supply at Barberton. Analysis of samples of water from the pumping station and two points on the distribution system, showed the water to be of excellent quality and suitable from a sanitary standpoint for public water supply purposes. Several manufacturing plants are connected with the water works system for fire protection only, the water supply for these plants being furnished by privately operated pumping stations. The State Board of Health had recommended that the valves connecting with the city water supply be locked and the key kept by the health officer, but it was found that this recommendation had not been complied with and the attention of the authorities was called to the matter.

A report was made of an investigation of the public water supply of Marion, upon the suggestion of Dr. Grube, on account of the large amount of sediment and turbidity in the water drawn from the mains. It was found that the water company is constructing a concrete reservoir with the idea of reducing the iron content and thereby the sediment and turbidity of the public water supply. Except for the sediment and turbidity, the results obtained indicate a water of safe sanitary quality.

SEWERAGE AND SEWAGE PURIFICATION.

Andover, Sandusky and Oak Harbor were visited by one of the engineers relative to proposed sewerage or sewage purification; a conference was held in Cincinnati with the village engineer of Reading relative to the construction of sewerage for Reading; a conference was held at Sandusky with the mayor and village engineer of Put-in-Bay relative to proposed sewerage for that village; and a visit was made to Toledo to inspect District No. 1, Lucas County. Reports have been prepared on Croton, Cuyahoga Falls, Andover, Oak Harbor, Sandusky, Put-in-Bay and Main Sewer District No. 1, Lucas County, for consideration at this meeting.

An informal report has been made on the feasibility of connecting a proposed system of sanitary sewers at Euclid Beach Park with the Cleveland system. An engineering firm of Cleveland has been engaged by the management of the park to prepare plans for a sanitary system to eliminate the local nuisance caused by the discharge of sewage into the lake at the outlet previously used. It is understood that there will be no objection on the part of the city of Cleveland to the connection being made to the city sewer at the intersection of East 156th Street and the Lake Shore Boulevard; the final plans to be submitted to the State Board of Health for approval before connection is made.

Upon inspection of the progress of construction of the sewage puri-

fication plant at Amherst it was found that the work has in general been properly done but several defects and omissions were noted and a letter was sent to the mayor calling attention to same. The most serious objection to the construction lies in the fact that only two units, with a total area of one-half acre of sand filters are being built, whereas the approved plans provide for three units with a total area of three-fourths acre. The mayor was told that the Board will expect the village to immediately provide for the construction of an additional unit.

One of the engineers inspected the sewage purification plant at Eaton and found it to be in a very run down condition, mainly due to almost complete neglect. The filters were badly clogged and overgrown with weeds to such an extent that they will rapidly deteriorate unless attended to in the near future. No concerted effort has been made to divert the excessive flow of ground water, which, added to the normal sewage flow, greatly taxes the capacity of the plant. Attention was called to the importance and necessity of at once employing a competent caretaker to have charge of the sewerage and sewage purification works, and the authorities were advised that the village engineer, or other officer, should be instructed to make such changes as will reduce the ground water flow.

Reports have been made upon recent inspection of the sewage disposal plants at the Greene County Infirmary and the Greene County Children's Home. These plants were found to have been well built and with proper care should produce satisfactory results. Several minor corrections that should be made to improve the plants were noted. These were pointed out to the authorities in a letter and they were advised to appoint an intelligent and faithful man to take care of the plants. It was suggested, owing to the close proximity of these institutions, that they might co-operate and engage one caretaker who could jointly care for the two plants.

Upon recent inspection of the sewage purification plant at Wilberforce University it was found that the plant is rapidly deteriorating owing to neglect in its operation. The sedimentation tanks were in need of cleaning; the filters were badly clogged and erosive action had deposited considerable sediment on the surface of the sand. The attention of the authorities was called to the necessity of detailing a man to properly operate and care for the plant and the assistance of our engineering department was offered in the instruction of such a man as to his duties.

Upon the request of Mr. J. G. Hale of Cleveland, a report has been made by the engineering department upon an examination of the small sewage disposal plant at Willoughby-on-the-Lake, a small community northeast of Cleveland. The present means of disposing of the sewage was found to be entirely inadequate and objectionable. The pollution of the beach caused by the discharge of unpurified sewage gives rise

to foul odors and probably pollutes a nearby bathing beach. It was suggested that an expert engineer be employed to remedy conditions before the summer of 1912 and Mr. Hale was asked to keep the department informed of the progress made in improving conditions.

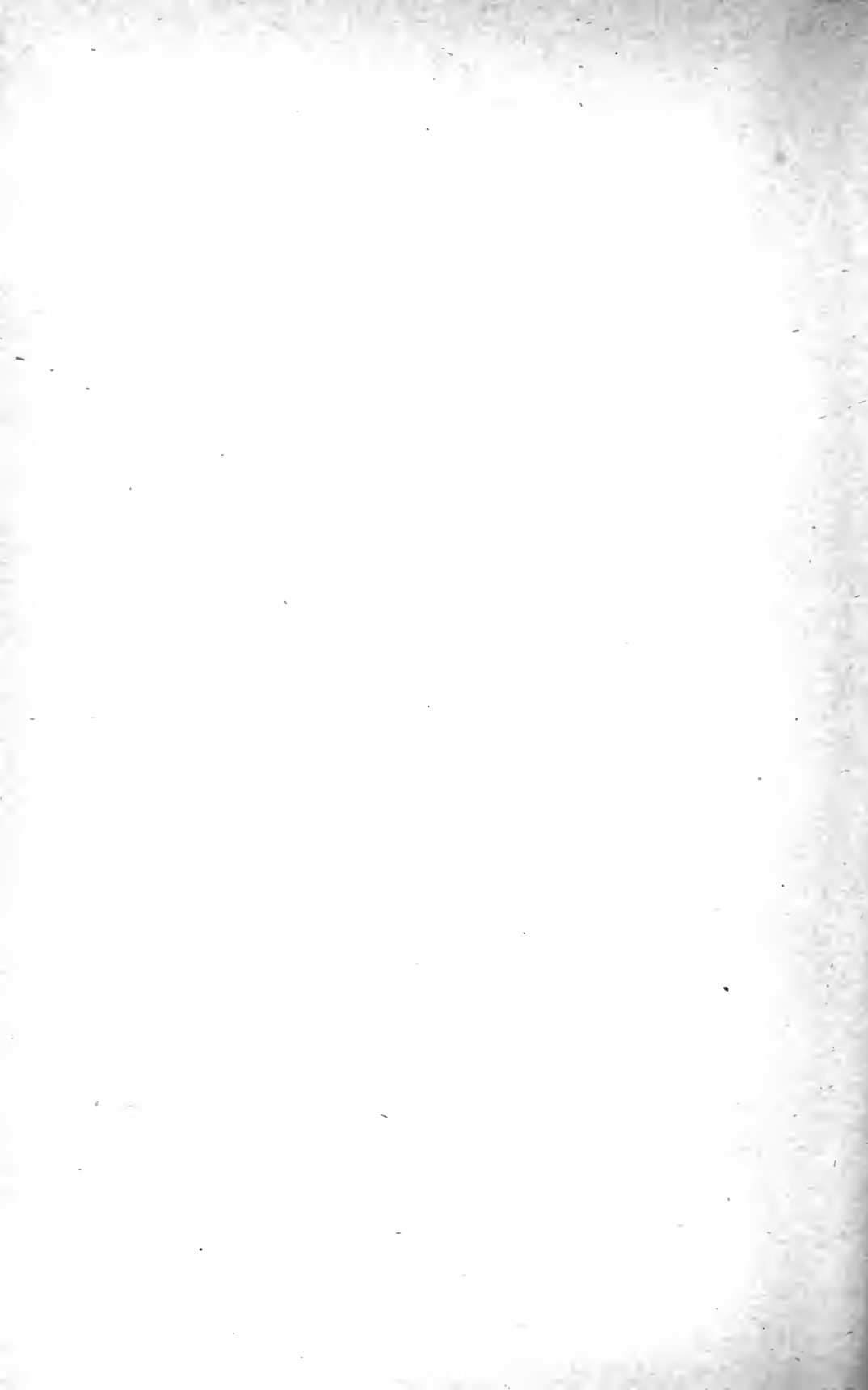
NUISANCE.

Complaint was made by residents of Port Clinton of bad odors caused by the discharge of a number of sewers along the lake front; it also being the principal residential street. The sewers are completed. The authorities endeavored to carry the outlets into the lake but they were not carried far enough. They were advised to intercept the sewage and carry the main outlet farther from habitation and to a point east of the village.

OPINION OF THE ATTORNEY GENERAL.

The Attorney General advised that the Board withdraw its request for an opinion as to the authority of the State Board of Health to enforce the conditions of approval of the public water supply of Apple Creek, as specified in the letter of approval of July 6th, 1909. The Attorney General expressed himself as of the opinion that it would be inadvisable, owing to pending litigation to attempt to enforce the penalty clause of Section 1246 G. C. The acting secretary consented to the withdrawal of the request for an opinion with the understanding that the Attorney General write a letter to the mayor of Apple Creek, calling attention to the condition of the Board's approval of July 6th, 1909, and the necessity of enforcing every precaution necessary to protect the public health through the use of the public water supply. This was done November 25th, 1911.

Since the last meeting 25 places have been visited and 25 investigations have been made by a representative of the Board. Two conferences have been held with village engineers relative to sewerage questions, and the President and Acting Secretary attended the meeting of the American Public Health Association at Havana, Cuba, as authorized to do.



PUBLIC WATER SUPPLIES

(163)

REPORT ON PROPOSED WATER SUPPLY FOR ALBANY.

On October 5th, 1911, plans for a proposed water supply for Albany were received from Mr. O. B. Murphy, mayor of the village. On October 13th, 1911, one of the engineering assistants visited Albany and made an investigation of the proposed improvement. The following report was submitted:

Albany, a village of 670 population, is located in the southwestern portion of Athens County at the headwaters of Margaret Creek, a tributary of the Hocking River. The topography in and about the village is hilly, the summits of the hills rising to an elevation of from 100 to 150 feet above the valleys. Sandstone outcrops in the hills and this is underlaid by limestone which may be seen at various points of outcrop. In the valleys the limestone is covered by a waterbearing layer of quicksand, which is in turn topped by clay with a thickness of ten or twelve feet.

The village is at present without manufacturing industries and has no public improvements such as sewerage, water works, etc. The drainage of the village is by means of surface ditches. Loosely constructed privy vaults are in general use and these are in many cases in close proximity to private wells. These wells are for the most part shallow dug wells not over twelve feet deep, the supply being obtained from the quicksand underlying the clay.

Proposed Water Supply Developments. As a result of a fire which occurred in the spring of 1911 and destroyed a large part of the business district of the village, it is desired to install a water supply for fire protection purposes. As proposed it will also be used to a limited extent, however, for business and domestic use, as water is to be supplied to a new hotel under construction. It is, however, intended to prevent the general use of the water for domestic purposes.

It is proposed to obtain the water supply from a spring located in the western portion of the village outside the built-up district. The spring is on a hillside at an elevation of about fifty feet above the center of the village. The sketch plans which have been prepared by Mr. F. R. Baker, engineer, of Athens, Ohio, provide for the construction of a pumping station at the spring; a 25,000-gallon, concrete covered reservoir on the top of a hill nearby; and a distribution system with about 2,000 feet of 4-inch cast iron pipe.

The spring has been used for cattle watering purposes. It is surrounded on three sides by low retaining walls built of sandstone blocks with open joints, and there is thus formed a pool about twenty feet square. The spring is somewhat exposed to the danger of pollution owing to the presence of a house, stable and dog kennel about 150 feet west of and above the spring; a privy about 100 feet west of and above

the spring; and a house and privy about 100 feet east of the spring. There is also danger from surface contamination of the spring owing to the fact that the walls are not water-tight.

The estimated available yield of the spring is not known, but observation made by a representative of the State Board of Health would indicate that the flow is insufficient to supply the village regularly.

The plans of the engineer are insufficient in detail as regards the method of developing and protecting the spring. If the spring is used in its present condition, and it appears that such is the intention, the supply cannot be considered satisfactory even for fire protection. The use of the supply for a new hotel will no doubt encourage the demand for other connections, as has been the experience elsewhere in Ohio.

Quality of Water. Due to the turbid condition of the spring, no sample was secured on October 13th, but on October 19th, 1911, Dr. E. H. Stanley, of Albany, collected and submitted for analysis a sample from a driven well located about twenty feet above the spring and deriving its supply from the same waterbearing horizon. The analysis of this sample is appended. The results indicate a water receiving a small degree of pollution. The chemical results are not especially unfavorable, although the nitrogen content would indicate some organic contamination. The physical condition of the water is unsatisfactory owing to turbidity, caused, no doubt, by the iron content. The presence of the colon bacillus in ten cubic centimeter would indicate that the well is subject to the danger of sewage pollution.

SUMMARY.

While the proposed development of a water supply at Albany is apparently for fire protection purposes, it is of the utmost importance that recognition be taken of the likelihood of future service connections for domestic use. The plans submitted do not provide sufficiently for the protection of the supply against pollution and its safety cannot be assured. Moreover, an analysis of water from a nearby well indicates a polluting influence.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the State Board of Health disapproved the plans submitted by Mr. O. B. Murphy, mayor, October 5th, 1911, for a proposed water supply for the village of Albany, the said supply to be obtained from a spring located on a hillside in the western portion of the village outside the built-up district.

The Board advised that search be made for a more satisfactory supply, but in the event of failure to locate such a supply that detailed revised plans providing for proper protection of the present proposed supply be prepared and submitted to the State Board of Health.

It was also stated to the authorities of Albany that the Board had had under advisement at different times water supplies that were installed solely for fire protection with full knowledge that the water was not suitable for drinking and domestic purposes, that in nearly every case such supply had been used for drinking and domestic purposes in spite of any precaution that the local authorities made to prevent such use.

EXAMINATION OF WATER FROM ALBANY.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Ammonia Free	Nitrites.	Nitrates.
10891	1911 Oct. 19	4	22	very dis.	none	.39	.050	.006	trace	.8

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10891	3.	41.	0	.....	119	13	2.6	100	in 10 c. c.

Source of Sample.

Driven well. Sample collected by Dr. E. H. Stanley after three hours' rainfall. After pumping out, the bottom of the well was found sandy, which fact accounts for the riled water.

REPORT ON PROPOSED WATER SUPPLY FOR AMHERST.

On January 2d, 1911, there were received from Mr. Jacob Baus, secretary of The Amherst Water Works Company, plans prepared by the Aetna Engineering Bureau of Chicago, for a water works system for Amherst. The engineering department reported on these plans as follows:

The village of Amherst, having a population of about 2,100, is located in Lorain County and at present, with the exception of some fire cisterns, has no public water supply, although it has an adequate sewerage system.

It is now proposed to install water works — and in fact some of the mains are already laid — and to derive the supply from the water works of the city of Elyria, connecting with same at the Elyria filtration plant, which is located on the shore of Lake Erie about four miles north of the village of Amherst.

A 10-inch cast iron main will extend from the filtration plant to a point in Cleveland Street in the northeastern part of the village, at which point it will connect with the distribution system which consists of 4,500 feet of 10-inch pipe; 10,200 feet of 8-inch pipe; 17,400 feet of 6-inch pipe; and 15,900 feet of 4-inch pipe. In addition, there will be fifty double nozzle fire hydrants. One year after completion of the work, it is expected that there will be supplied some 200 private dwellings, one hotel, one power house, and 48 business establishments. The services are to be of lead and galvanized iron pipe.

It is expected that about 250,000 gallons of water per day will be used, and this amount seems to be a reasonable quantity for the needs of the village for some years to come. It is believed that fire pressure as high as 150 pounds can be obtained. The cost of the plant will be \$57,000.

The source of supply—the Elyria filtration plant—is fully described in the special report of the State Board of Health on Water and Sewage Purification published in 1908, on page 109. A recent inspection of the Elyria plant shows that it still has more than ample capacity for the needs of Elyria, and that the introduction of water meters in that city is causing a reduction in the daily consumption. The filter plant, therefore, will be of ample capacity for some years to come to supply the needs of both Elyria and Amherst without operating the filters at rates that would be detrimental to purification.

ACTION OF THE BOARD.

At a meeting held March 2d, 1911, the State Board of Health approved the plans for a water supply for Amherst, as shown on drawings submitted January 2d, 1911, by Mr. Jacob Baus, secretary of the Amherst Water Works Company, and prepared by The Aetna Engineering Bureau of Chicago; said supply to be derived from the Elyria water works.

REPORT ON PROPOSED WATER SUPPLY FOR ANDOVER.

At the request of Mr. J. W. Cook, secretary of the board of trustees of public affairs, one of the engineering assistants visited Andover February 8th, March 8th and 22d, and April 3d, 1911, for the purpose of collecting samples of water for analysis and making the necessary examinations relative to the proposed sources of supply. The following report was submitted:

The village of Andover is located in the southeastern portion of Ashtabula County, two and one-half miles west of the Pennsylvania state line. The population according to the 1910 census is 902, showing an increase of 87 in the past ten years. The village is essentially a farming community with practically no municipal improvements. However, plans for a complete system of sanitary sewers and sewage purification plant have received the approval of the State Board of Health. The site of the village and surrounding country is slightly undulating. The geological formations consist of surface clay to a depth of 4 feet, underlaid by a fine shaley sandstone to a depth of 29 feet, grading off to a harder sandstone extending to a depth of 36 feet.

Chase Site. It was originally proposed by the local authorities to obtain a water supply from wells located in the northeastern portion of the village approximately 100 feet west of the L. S. & M. S. Railway on land known as the Chase lot. A test well was put down on this site, which penetrated the following formations:

<i>Thickness of Stratum.</i>	<i>Depth to Bottom of Stratum.</i>
Surface clay and sand.....	4 feet.
Very fine shaley sandstone.....	10 "
Finer and harder sandstone.....	15 "
Very hard sandstone.....	7 "
Shale	42 "
Coarse sandstone (waterbearing).....	13 "
Shaley sandstone	53 "

The well was cased with a 6-inch cast iron casing to a depth of 29 feet, the casing being driven several feet into the hard sandstone for the purpose of making a watertight joint. The supply of water was obtained from the coarse sandstone stratum underlying the shale. After continuous pumping for three and one-fourths days, by means of a drilling machine operating at the rate of 52 strokes per minute and causing a discharge of approximately 72,000 gallons in twenty-four hours, a sample of the water was collected for analysis. The analytical results in the case of the Chase well indicated a water of good quality from a sanitary standpoint. However, owing to the proximity of some six or eight privies and the possibility of contamination from surface drainage, the local authorities were advised to select a more suitable site.

Strickland Site. The site next chosen for the proposed public supply wells is located in the northeastern portion of the village just south of the northerly corporation limits on land owned by Mr. J. Strickland. This site was very satisfactory with respect to contamination from surface and underground sources. However, subsequent drilling to a depth of 140 feet showed the formations in the locality to be practically free from water. At the time of selecting the Strickland site, an alternative site was pointed out as being equally acceptable. This site is located near the northerly corporation limits on land owned by Mr. Clair, but was not available without condemnation proceedings, which the local authorities hesitated to make.

Litwiler Site. Owing to the unsatisfactory location of the Chase well and the failure to obtain water in sufficient quantities northeast of the village, the local authorities put down a test well on land owned by Mr. I. S. Litwiler. This site is in the northern portion of the village adjoining the L. S. & M. S. Railway. The land comprises about one and one-half acres and is surrounded by some six or eight houses within 600 feet. The surface drainage is in a southeasterly direction directly over the site of the proposed wells. There are also some six or seven privies within a radius of 400 feet from the proposed well. A test well 8 inches in diameter was drilled to a depth of 45 feet, penetrating the following formations:

Surface soil	2 feet.
Loose sand rock.....	18 "
Hard fine white sand rock.....	25 "

An 8-inch casing extending to a depth of 28 feet and driven two feet in the hard sand rock, is expected to prevent the entrance of any surface contamination. This well was pumped continuously for 80 hours at an average rate of discharge of 80,000 gallons per day. At this rate of discharge, the normal water level which was five and one-half feet below the surface of the ground, was reduced to 26 feet. When pumping ceased, the water regained its normal level in five minutes. Just previous to discontinuing the test, a sample of the water was collected for analysis. As indicated by the analytical results, the water from this well is of very good quality from a sanitary standpoint. The organic content is very low, as is also the number of bacteria. The water is somewhat below the average of Ohio ground waters in hardness, which is 160 parts per million. There are no bacteria of intestinal origin in 10 cubic centimeter portions. At the time of collecting a sample from the test well, a sample was also collected from the drilled well at the house of Mr. Litwiler, 300 feet north of the proposed well. The analytical results of the water from this latter well while not so good as that obtained from the proposed public supply well, are satisfactory from a sanitary standpoint.

It was stated by the local authorities that every effort will be made to exclude surface drainage from the public supply wells as well as to regulate by inspection the proper maintenance of privies within this vicinity. It is intended to put down three more wells within 200 feet radius from the test well, providing approval of this site is received from the State Board of Health.

CONCLUSIONS.

In conclusion it may be stated that a sufficient quantity of ground water in the vicinity of Andover available for public supply purposes is limited to a rather restricted area extending through the northern and central portions of the village. This is indicated by the failure to find sufficient ground water in the northeastern portion of the village and the reports of several borings for oil in the southern and eastern portions of the village, all of which penetrated formations practically void of water.

In view of the satisfactory quality of the water from the well on the Litwiler site as indicated by the analyses, and the improbability of encountering water in sufficient quantities at points farther removed from habitation, it is suggested that the site proposed for public supply wells on land owned by Mr. I. S. Litwiler, be approved.

ACTION OF THE BOARD.

The State Board of Health considered the Litwiler site (No. 2 location, so-called) as a location for public water supply wells for the village of Andover, said site being shown on a drawing submitted by Mr. L. E. Chapin, consulting engineer, on January 11th, 1911.

This site was approved provided:

1st. That detailed plans showing the method of obtaining and storing the water supply before same is delivered to consumers, be submitted to and receive the approval of the State Board of Health before the works are placed in operation;

2d. That no future wells be placed nearer than one hundred feet of any boundary of the water supply land, without first submitting the question to the State Board of Health for approval; and

3d. That approval of this site be void unless construction of the works has been completed before January 1st, 1913.

EXAMINATION OF WATER FROM ANDOVER.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10152	1911 Feb. 8	2	18	slight	none	0.30	.056	.234	trace	0
10153	Feb. 8	4	trace	none	none	0.05	.030	.030	trace	0
10217	April 4	none	2	sl. trace	none	0.10	.022	.014	0	0
10218	April 4	none	0	trace	0	0.10	.012	.002	trace	1.6

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10152	31.0	186	15	.....	288	27	1.2	3	Not in 10 cc.
10153	9.5	142	35	.....	210	20	0.6	5	Not in 10 cc.
10217	7.0	140	20	.....	217	33	0.5	2	Not in 10 cc.
10218	15.0	106	52.5	.....	256	72	0.7	15	Not in 10 cc.

Sources of Samples.

10152. Proposed public supply well No. 1 on Chase Lot. Well is 144 feet deep, penetrating fine sand rock, shale and coarse sandstone. Sample collected after pump test and from pump discharge by M. Z. Bair.

10153. Well No. 1 at Ohio & Pittsburg Creamery, located 400 feet north of well No. 1 on Chase Lot. Depth of well 28 feet. Formations penetrated, clay 4 feet, fine sandrock 14 feet, and hard sandstone 10 feet. Sample collected by M. Z. Bair.

10217. Proposed public well supply on Litwiler lot. The well is 45 feet deep, penetrating 18 ft. loose sand rock and 25 ft. fine white sandrock. Sample collected after pumping test.

10218. Sample collected from private well at house of Mr. Litwiler during investigation of proposed public water supply. Well is 300 feet north of proposed public supply well on Litwiler lot, driven 38 feet in loose sandrock. Sample collected by M. Z. Bair.

REPORT ON PLANS FOR CERTAIN DETAILS NECESSARY FOR THE COMPLETION OF THE WATER PURI- FICATION PLANT AT BELLAIRE.

On May 22nd, 1911, there were received from Mr. L. E. Chapin, consulting engineer for Bellaire, plans for certain features of the uncompleted water purification plant for the city of Bellaire, specifications for same being received on May 19th. These were submitted in compliance with an order of the State Board of Health under the Bense Act. The engineering department examined the plans and specifications and submitted the following report:

The present population of Bellaire is about 13,000. The water supply is obtained directly from the Ohio River at a point not only immediately below the cities of Wheeling, Martins Ferry, and Bridgeport, but also below some of the sewer outlets of Bellaire itself. The typhoid death rate at Bellaire has been abnormally high for many years.

In September, 1905, the State Board of Health approved plans for a mechanical filtration plant for the city, prepared by Mr. L. E. Chapin, consulting engineer. These were approved subject to certain minor conditions which as far as possible have since been fulfilled. (For a description of the original plans for the filtration plant and also for a record of the action of the Board, see Annual Report for 1905, pages 63-67.) Construction was later started on the filtration plant and it was practically completed by April, 1908, although it was impossible to place it in operation for the reason that there was still lacking certain apparatus for the purchase of which the city government did not provide funds.

For several years the city of Bellaire has been in the position of having a nearly completed filtration plant involving the expenditure of \$33,000, and still being obliged to drink polluted water. Realizing this, the board health of Bellaire on November 11th, 1909, petitioned the State Board of Health under the Bense Act to require the completion of the filtration plant. After making an investigation and giving a hearing to the Bellaire officials, the order requiring the completion of the plant, duly signed by the Governor and the Attorney General, was sent to the mayor and council and the director of public service on December 6, 1910. Soon after the city engaged the services of Mr. Chapin, who now submits plans and specifications for completing the plant.

The plans involve:

(1) The strengthening of the walls of the sedimentation basin and rendering same watertight. This is made necessary by the fact that since construction dangerous cracks have developed in the walls, which render the basin unsafe and practically useless.

(2) The installation of rate controllers and loss of head gages.

(3) The installation of a blowing machine to assist in cleaning the filters.

(4) The installation of a centrifugal raw water pump.

(5) The construction of a laboratory building.

Referring to the strengthening of the sedimentation basin walls, this is to be done by the construction of buttresses at intervals of 15 feet, around the outside of the walls. These buttress walls are to be 30 inches thick, heavily reinforced, and will be bonded to the old work by roughening up the face of the old wall and also by the use of $\frac{3}{4}$ -inch steel rods 3 feet long, extending 8 inches into the old work.

The details of the rate controllers and loss of head gages are not shown, but detailed plans of the existing piping and filter connections have been submitted, clearly indicating where the apparatus is to be installed. General specifications covering the capacity and design of the controllers have been prepared and bids from the various manufacturers will be asked. The same applies to the loss of head gages.

The blower and centrifugal pump are covered by general specifications. The former is to have a capacity of 800 cubic feet of free air per minute compressed to five pounds atmospheric gage pressure. It is to be directly connected to a vertical self-contained, self-oiling steam engine. The centrifugal pump is to have a capacity of 33,500 gallons per minute against a total lift of 48 feet.

The laboratory building will be a brick structure 18 feet by 10 feet, with a wooden roof, and is to be built adjacent to the existing coagulant room. It is well ventilated and lighted.

There is one feature in connection with properly completing the filtration plant, which the consulting engineer fails to consider. This relates to the filtering material. Our investigations have shown that owing to delay in the delivery of the material at the time of its installation, the sand and gravel were indiscriminately placed in the filters with no thought to proper grading, it being claimed by the contractor that the material would grade itself with repeated washings. This material should all be removed, screened, and properly placed, before the filter plant can be considered to be in satisfactory working order.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health approved the plans and specifications covering the additional concrete work, controlling devices, machinery, and laboratory building, necessary to complete the existing water purification plant at Bellaire, submitted by Mr. L. E. Chapin, consulting engineer, on May 22d, 1911, upon the following conditions:

1st. That the filtering material now in the filters be removed, screened, and properly replaced;

2d. That when completed, the filtration plant be placed in charge of a trained operator and analyst, whose appointment shall first be approved by the State Board of Health; and,

3d. That detailed plans of whatever rate controller is finally chosen, be submitted to the State Board of Health for approval before the controllers are placed.

In compliance with the third condition of the Board's approval of June 1st, 1911, plans and specifications for rate controllers were received from Mr. L. E. Chapin, consulting engineer for Bellaire, on June 19th, 1911. These were referred to the engineering department and the following report submitted:

The controllers, of which there are to be eight, are of the type manufactured by the American Water Softener Company. They are to be 3 feet in diameter and 3 feet high. Each consists of an enclosed cast iron chamber containing a copper float which regulates the head of water on a number of orifices. The maximum rate of discharge through these orifices can be fixed; and this will be the continuous rate of discharge, provided the water is supplied to the controller in sufficient quantities. The principle is not a new one and the design is simple.

The specifications also describe the loss of head gages which are to be furnished, but these have in effect already been approved in the former action of the Board.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health considered these plans for rate controllers, for use in the Bellaire filtration plant, as shown on the drawings and described in the specifications of the American Water Softener Company, and submitted by Mr. L. E. Chapin, consulting engineer, on June 19th, 1911.

These plans were approved provided, that each controller, after installation, be so adjusted, by actual test, that its maximum rate of discharge will not exceed 690,000 gallons per twenty-four hours (corresponding to a rate of filtration of 125,000,000 gallons per acre per day); and that the adjusting device be then permanently fixed so that this rate cannot be exceeded.

The authorities were also notified that this adjustment should be made to the satisfaction of a representative of the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR BREMEN.

On July 7th, 1911, there were received from Mr. E. G. Bradbury, consulting engineer for the village of Bremen, plans and description of a proposed water supply for that village. In anticipation of these plans being submitted a representative of the engineering department visited Bremen on March 16th and May 1st, 1911, and samples of water were collected. The plans having been referred to the engineering department, the following report was submitted:

The village of Bremen is located in the extreme easterly portion of Fairfield County between Rush Creek and Raccoon Run. The village is fairly level, although immediately to the west the ground rises sharply. The village has no sewerage system, paved streets, nor other municipal improvements. The population, according to the 1910 census, is 925, which represents an increase of over 100 per cent. during the previous ten years. This may be accounted for by the development, within the past three or four years, of the Bremen oil field in close proximity to the village. The present area within the corporation limits is about 0.16 square mile and it is proposed to increase this 0.4 square mile.

Bremen is located entirely within the broad valley of Rush Creek, which is bordered by hills rising from 100 feet to 165 feet above the level of the valley. The geology of the locality may be described as follows: The whole region is underlaid by the Waverly group of sandstone, which rises in the hills to an elevation above the surface of the valley and is frequently found as outcrops along the hillside. In the valley the rock is found at a depth of from 80 to 100 feet, it having been removed to this depth by erosive action in the ancient valley. The bed rock in the valley of Rush Creek is overlaid by drift deposits of gravel, sand and clay. The total thickness of these deposits has been observed at various points to vary from 60 to 100 feet. The drift deposits on the hills are comprised almost entirely of clay with little gravel, and are not waterbearing.

The first stratum which yields water is at a depth of from 18 to 20 feet, which depth varies very little throughout the whole valley. Directly above the stratum of gravel is found a thin strata of clay about 18 inches thick. This stratum is not known to be continuous and it is probable that in certain portions of the valley it may disappear entirely. Another stratum of gravel is found just above the bed rock, but this has been found to contain practically no water, as indicated by the drillings for oil throughout the entire valley.

It is quite probable from information obtained from a local well driller that water may be obtained from the upper gravel stratum at any point in the valley. The study of the geological features indicates that the water is secured from the valley itself and not from the border-

ing hills, owing to the fact that the latter are made up of impervious material. It is also probable that water from deeper sources cannot be obtained.

It is estimated by the designing engineer that the water consumption for the immediate future will not be over 25,000 gallons daily, although the works have been designed large enough to supply at least 150,000 gallons. The supply is to be derived from three driven wells located on a half-acre lot of land immediately south of Spring Street near the westerly corporation line.

These wells are to be 8 inches in diameter and 20 feet deep, and will penetrate gravel formation through the entire distance. The lower 7 feet of the well casing is perforated with $\frac{5}{8}$ -inch holes. One of these wells, used as a test well, has been sunk, and after a five days' pumping test shows 130,000 gallons per day to be available. This present available quantity may decrease, however, during extended periods of dry weather.

There are no houses within 300 or 400 feet of the proposed site, and only three within 500 feet lying to the southeast. About 100 feet to the westward a hill rises to an elevation of 125 feet above the village. This location is to be used for the distribution reservoir. Nearby is an ice pond which is fed by springs along the hillside. The land around this pond is kept clean and trespassing is forbidden.

Quality of Water. Samples of water collected at the termination of a pumping test showed the water to be of excellent sanitary quality from both chemical and bacteriological standpoints. It contains no in-crustants, although it is rather high in alkalinity or temporary hardness. The only objectionable feature of the water was its rather high iron content. This, however, will doubtless be reduced after the wells are in continuous use and will probably not be objectionable, especially with the aeration and sedimentation which the water will receive after being pumped into the distributing reservoir and stored therein.

The type of pump to be used has not yet been decided, but it is proposed to use a gas engine for the motive power. The mechanical equipment will be located in a neat pumping station near the wells, plans for which are submitted. The wells are to be pumped by direct suction and the water raised through an 8-inch force main into the distributing reservoir. This reservoir, which is to be constructed on the hill above mentioned, is to be 43 feet in diameter by 15 feet deep, thus giving a capacity of 150,000 gallons below the overflow.

The 8-inch force main also acts as the principal supply main for the village and extends from the reservoir to a point near the easterly corporation line, a distance of some 3,000 feet. The remainder of the distribution system is composed of 18,000 feet of 6-inch cast iron pipe, so arranged that there will be but four dead ends. It is expected that

a fire pressure of 85 pounds will be obtained by cutting off the reservoir and pumping into the distribution system, while the reservoir alone will furnish a pressure of about 40 pounds.

At a meeting held July 19th, 1911, the State Board of Health considered these plans and the question was referred back to the chief engineer for further information in regard to the gravel formation in which the water is found and also relative to sub-soil drainage.

On August 29th, 1911, the assistant engineer in company with Mr. E. G. Bradbury, consulting engineer for Bremen, visited that village to make further examination regarding a proposed public water supply. The following notes were submitted:

Advisability of Selecting a New Site for Public Supply Wells. On the day of the visit the valley was examined both north and south of the village, with a view to selecting a more suitable site for public supply wells. There are many level open tracts of ground, free from habitations in both directions, where public supply wells might be installed. To all appearances the sites would be eminently suited for public supply wells. The land of the valley of Rush Creek, however, both north and south of the village, is entirely covered by lease-holds of various oil companies, and will probably within the next few years be more or less completely drilled in search of oil. It will be difficult, therefore, to obtain a suitable lease for water works purposes, and even if secured, there would be a likelihood of future oil wells being placed in close proximity to the public supply wells. This forms a serious objection to the selection of a site on land to be prospected by the oil companies in the future.

It is claimed that large quantities of salt water are pumped from the oil wells and discharged upon the surface of the ground. Possibly also the salt water under artesian pressure penetrates the gravel strata. A large number of private wells in the southeastern part of the village have become so salted that the inhabitants are forced to carry water from portions of the village where such conditions do not as yet prevail. This is one of the most urgent reasons for the immediate installation of the public water supply.

The pollution of the ground water by salt, in the manner described, explains the statement of the local officials made at the last meeting of the Board and also previously, that there was but one feasible site for public water supply. In the mind of the local officials all other sites, which could be used under normal conditions, were either polluted by salt water or were leased by oil companies and would be subject to further salt pollution.

Additional Information Concerning the Proposed Site. The site selected by the village (referred to in previous reports as site No. 2), is so located with respect to the oil wells that there is little danger from the salt water. It is, however, sub-leased from oil companies, but there will probably be no future drilling in the vicinity owing to the fact that many dry holes have been encountered in the vicinity.

The area which the village controls at the present time as a site for public supply wells is only 0.5 acre. Although the area included in the present site is sufficiently large for the proposed installation, yet a larger amount of land should be obtained in order to afford a suitable protection to the supply. Within a radius of 500 feet, moreover, it will be absolutely necessary that there be enforced village regulations to prevent contamination of the soil. This would include enforced construction of watertight privy vaults until sanitary sewers are available, and a rigid inspection, by the village officials, to maintain sanitary conditions.

Prospecting within the next few years of the land north of the village may demonstrate the impossibility of securing oil at this point. If this results, this locality would be made available for public supply wells without the danger of salt water contamination.

SUMMARY.

A review of the conditions at Bremen indicates that a public water supply may be obtained at any point in the valley of Rush Creek. The probability of future contamination of wells located north or south of the village by oil well wastes, however, limits the selection of a location where future prospecting will not occur. Such a location, it appears, can only be obtained at the site selected by the village. The danger of contamination of the wells on this site from encroaching habitations will require, however, that strict regulations be enforced to prevent soil pollution.

The village should pass an ordinance requiring the construction of watertight cesspools or privy vaults within a radius of 500 feet of the site.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 14th, 1911, the question of the proposed source of water supply for Bremen was considered, and it was voted to not approve the same; and to advise the authorities at Bremen that the Board's chief engineer would confer with their consulting engineer with reference to the choice of a new site.

REPORT ON PROPOSED PUBLIC WATER SUPPLY AT
FREDERICKSBURG.

In the summer of 1909 a public water supply system was installed at the village of Fredericksburg without the knowledge or approval of the State Board of Health. Information regarding the existing supply having reached the Board in October, 1910, an examination was made by the engineering department on October 19th, 1910. As this examination showed that the water was of safe quality, the officials were notified that they might continue its use but were requested to submit a general plan of the water works in order that the State Board of Health might take definite action thereon. Accordingly, on April 8th, 1911, a sketch-plan showing the desired information was received and was referred to the engineering department. The following report was submitted:

The village of Fredericksburg, Wayne County, has a population of 507 according to the 1910 census, and an area of approximately three-fourths square mile. The village is essentially a farming community and has no important industrial establishments.

The topography of the village is rolling and one-half mile easterly the hills rise to a height of about 150 feet above the town. Under the village the blue clay extends to a depth of 80 or 90 feet, and under this is sandstone of unknown thickness. Veins of coal No. 6 and No. 7 are found in the hills to the east.

A water works system was installed for the village in 1909 at a cost of \$7,000. It comprises a 6-inch drilled well, a small pumping station, a distribution reservoir, and about 0.9 mile of cast iron mains.

The supply is derived from a 6-inch drilled well located in an alley, west of the main street near the center of the village. The depth of this well is 91 feet, 88 feet of which is in blue clay and the remainder in sandstone. The well is cased within a few feet of the sandstone, and the casing projects several feet above the surface of the ground. There are three privy vaults and several barnyards within 150 feet of the well, and the surface drainage from these is toward the well. On account of the stratum of blue clay, however, and also on account of the small quantity of water daily extracted from the well, it is doubtful whether these vaults and barnyards could be considered, at present at least, a serious menace.

Before pumping, the well flowed under artesian pressure at a rate of approximately half a gallon per minute. At the present time the daily consumption is said to range from 10,000 to 20,000 gallons per day, although no accurate records are kept.

The analytical results of the sample collected by a representative of the State Board of Health show that the water is satisfactory from a sanitary standpoint. The bacterial results show a total count of only

4 and no bacillus coli present. While the alkalinity of the water is fairly high, the incrustants are very low.

The pumping station is located directly over the well. It is a small structure 15 feet square and contains a five-horse power gasoline engine directly connected to a horizontal plunger pump of 25,000 gallons nominal capacity. The water is pumped through a 6-inch force main into a distribution reservoir located on a hill one-fourth mile southeast of the pumping station and about 150 feet above it. This reservoir in excavation with bottom and sides paved with brick surfaced with cement. It is 13 feet deep, 32 feet in diameter, and has a capacity of 78,000 gallons. It is covered with a wooden roof.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health approved the public water supply of Fredericksburg, derived from a drilled well located near the center of the village as shown on a sketch-plan submitted April 8th, 1911, upon the following conditions:

1st. That no more wells be drilled without first notifying the State Board of Health and obtaining its approval thereof; and,

2nd. That the village enact an ordinance requiring all privy vaults within 300 feet of the public supply well to be made watertight, and that all vaults and barnyards within this distance be regularly inspected by the health officers and required to be kept in a sanitary condition.

EXAMINATION OF WATER FROM FREDERICKSBURG.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
9931	1910 Oct. 19	trace	none	none	none	1.00	.014	.012	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
9931	2.5	194	2.5	.....	257	36	0.1	4	Neg. in 1 and 10 cc.

Source of Sample.

Public supply well. Drilled 90 ft. Formations penetrated: blue clay 88 ft.; sandstone 3 ft. The well is cased to the rock and protected at top. Water flows under pressure. Sample collected from faucet on distribution system. Temperature of air, 69°F.; water, 53°F.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY AND IRON REMOVAL PLANT FOR HIRAM.

On November 4th, 1910, application was received from George H. Colton, village clerk, for approval of proposed additional water supply to be derived from a new well, and on July 11th, 1911, there was further received from Mr. Colton, a sketch plan showing a proposed iron removal plant to treat the water from said new well. In connection with this increased supply, a visit was made by a representative of the engineering department on December 12th, 1910. The plan being referred to the engineering department, the following report was submitted:

Hiram, a village of 422 inhabitants, is located in Portage County. The most prominent feature of the village is Hiram College, which accommodates 300 to 400 students. The village is well situated with regard to surface drainage and is maintained in a generally sanitary condition.

The present water supply was installed in 1897, and is obtained from two springs located one mile northwest of the village. The water from these springs is discharged by gravity into a collecting well, from which is pumped to a standpipe $\frac{3}{4}$ mile west of the village. Recently the use of these springs has been inadequate, during dry weather, to meet the daily consumption of 15,000 or 20,000 gallons.

After several unsuccessful attempts in 1908 to secure a supply from springs, the village authorities, in the fall of 1910, installed a drilled well near the present springs and pumping station. This well is 8 inches in diameter, 177 feet deep, and penetrates the following formations:

Surface soil	6 feet.
Shaley sand rock.....	130 "
Sandstone	41 "

The well is cased to a depth of a little over 6 feet into the sandstone. When not being pumped water stands within 6 feet of the ground; and after pumping at the rate of 40,000 gallons per twenty-four hours for six hours, the water level was reduced to 10 feet. The pumping test indicated that ample quantity would be available, especially as the well is to be used only as an auxiliary supply and will be called upon, in dry weather, to furnish an amount varying from a few gallons to only about 15,000 gallons per day. The well is excellently located from a

sanitary standpoint, there being no houses or buildings, other than the pumping station, with $\frac{1}{4}$ mile or more of the general locality.

Analyses of sample collected by Mr. George H. Colton, village clerk, show it to be satisfactory from a sanitary standpoint, and to contain only a moderate amount of hardness. There is, however, as shown by one of the analyses, an excessive amount of iron, which would cause complaint if the water were delivered to consumers in its existing condition.

To overcome this defect, it is proposed to construct a small iron removal plant, which has been designated by the local officials after inspecting a similar plant which is in operation at the neighboring village of Garrettsville. This plant comprises an aerator, settling tank and sand filters, all of which are included within a brick cistern 10 feet deep and 16 feet in diameter. Water from the new drilled well will be discharged against an umbrella-shaped hood by means of compressed air. This aerator is located about 10 feet above the water level in the cistern and immediately over a sub-compartment into which the water falls, and from which it passes into the main cistern through ten openings, each 5 by 10 inches, located near the bottom of the dividing wall.

The cistern or settling basin itself will afford at least twenty-four hours' sedimentation to the aerated water; and the settled water will pass on to a filter designed along the lines of the modern mechanical type. Its dimensions are 7 by $5\frac{1}{2}$ feet, and the filtering material consists of one foot of gravel by 3 feet of sand. The strainer system comprises fifty-four $\frac{3}{4}$ -inch pipes, each 3 feet long, leading to a 4-foot central collecting pipe. The small strainer pipes each contain four $\frac{3}{16}$ -inch holes to the lineal foot.

Provision is afforded for washing the filter by means of a 2-inch pipe carrying standpipe pressure, leading into the main collector just above the outlet valve. It is proposed to carry off the wash water through a 4-inch drain placed 3 feet above the filtering material. This is undoubtedly too small and, furthermore, there are no wash water troughs provided.

The proposed design is not prepared in accordance with the most approved practice, yet it is believed that approval should be granted, in view of the low rate of filtration proposed (17,000,000 gallons per acre daily), the small quantity of water which it will treat, and the fact that there is no strictly sanitary significance attached to its operation.

The design is based on the assumption that the iron in the water can be precipitated by aeration and sedimentation alone, as is the case with wells a few miles away at Garrettsville. If, however, it is found that the addition of lime is necessary, the apparatus for introducing this chemical can easily be added.

ACTION OF THE BOARD.

At a meeting of the Board held August 10th, 1911, the State Board of Health approved the 8-inch well, 177 feet deep, located adjacent to the water works pumping station at Hiram and proposed as a source of additional water supply for the village.

The Board also approved the plan for the iron removal plant submitted on July 11th, 1911, to be used to treat the water from said well, provided:

1st. That an adequate system of wash water troughs be installed at a height of 3 feet above the sand; and that the size of the main wash water outlet be increased to 6 inches.

2nd. That samples of the filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and, (Sample submitted September 5th, 1911, and approved September 8th, 1911.)

3rd. That approval be void unless the plant is commenced before January 1st, 1913.

REPORT ON WATER PURIFICATION PLANT FOR LAKE-SIDE.

At a meeting held December 7th, 1910, the State Board of Health adopted the recommendations of its special committee, consisting of Mr. John W. Hill and the chief engineer, after an investigation of the water supply and sanitary conditions at Lakeside had been made. These recommendations were that the wells be disapproved as a source of supply on the ground that it would be impracticable to obtain enough water from the ground to constitute a suitable water supply, and furthermore, that certain analyses had indicated that the ground water is at times polluted; and that the Lakeside Campmeeting Association be notified that the Board would expect it to submit to the Board at its meeting to be held January 25th, 1911, with a view of installing water purification works prior to July 1st, 1911, definite plans for installing a water purification plant of ample capacity; and definite plans for screening the sewage of Lakeside and discharging same through an iron pipe terminating in several outlets at least 1100 feet from the shore.

At the meeting of the Board held January 25th, 1911, the plans of the Pittsburg Filter Manufacturing Company were submitted by Mr. Otto H. Magly, secretary and superintendent of the Lakeside Campmeeting Association, and after being referred to the chief engineer for review, were approved upon the following conditions:

1st. That the clear water basin be enlarged so as to have a capacity of 125,000 gallons;

2nd. That the filter plant be completed and ready for operation before the opening of the season of 1911;

3rd. That full detailed plans be prepared and submitted to the State Board of Health at its meeting on February 23rd, 1911, for approval;

4th. That the said detailed plans provide for readily increasing the capacity of the filter and that such increase be made in the future whenever deemed necessary by the State Board of Health; and,

5th. That the management of the water purification plant be at all times under the direct charge of an experienced and efficient operator, whose appointment shall first be approved by the State Board of Health.

The Board also voted to require that the sewage of Lakeside be screened and that the iron outlet pipe be extended at least 1100 feet from the shore line, said pipe to terminate in several outlets; this screening and extension, likewise, to be done before the 1911 season opened, and plans for the screen chamber to be submitted to the Board on February 23rd, 1911.

April 6th, 1911, detailed plans were submitted. It was found that the clear water basin did not conform to the condition of approval but would be but approximately one-third the required size.

Lakeside was visited by a representative of the engineering department, who learned that very little progress was being made toward the construction of the water purification plant and that nothing had been done with regard to improving the sewage disposal conditions.

The secretary and superintendent of the Lakeside Campmeeting Association stated that the association did not intend to conform to the requirements of the State Board of Health in regard to the clear water basin, nor in regard to doing anything toward extending the sewer out let or properly disposing of the sewage on account of a lack of funds.

At the meeting of the Board held April 21st, 1911, a committee consisting of Dr. Oscar Hasencamp, member, and R. W. Pratt, chief engineer, was appointed to investigate and report on the progress that had been made toward the installation of water and sewerage improvements at Lakeside, ordered by the Board at its December 7th, 1910 meeting.

This committee, at the May 10th meeting of the Board reported as follows:

If the Board desires to insist upon the campmeeting association carrying out its requirements, it will be necessary to resort to some legal action to prevent the opening of the campmeeting grounds this year; or at least to warn the public against going there, as the Board has threatened to do in the past.

In the opinion of your committee, however, it is believed that if the water plant is installed according to the plans submitted, even though the storage capacity be less than that specified by the Board, such

plant could be used throughout the coming season with reasonable safety provided it is placed in charge of an expert analyst and filter operator. Such a man should be capable of disinfecting the water in an efficient manner in case it becomes necessary to so overwork the filters that proper purification by filtration is not secured. In this way the causation of typhoid fever due to drinking water at Lakeside could probably be prevented.

In regard to the dangerous conditions caused by the failure to properly screen the sewage or extend the sewer outlet as directed by the Board, it may be said first that the construction of a screen chamber on the main sewer is a very simple matter and should be insisted upon; and second, that the expert analyst and filter operator who may be placed in charge of the water purification plant should also be made responsible for accomplishing the proper screening and possibly the disinfection of the sewage before it passes into the lake.

At this meeting the Board voted to require the following:

1st. That the water purification plant at Lakeside, constructed in accordance with the plans submitted, be completed before the grounds are opened;

2nd. That a screen chamber be constructed along the line of the main sewer, and that necessary tanks for introducing a disinfectant into the sewage be also installed at such point;

3rd. That an experienced and efficient filter operator and analyst, whose appointment shall first be approved by the State Board of Health, be retained and placed in responsible charge of both the purification of the water and the screening and disinfection of the sewage during the coming season; and,

4th. That The Lakeside Campmeeting Association, before the 1912 season, enlarge the clear water basin to a capacity of 125,000 gallons, and extend the main sewer into the lake as previously directed by the State Board of Health.

At the meeting of the State Board of Health held on June 1st, 1911, in view of the fact that it was necessary to provide for the operation of the plant before the July meeting of the Board, the matter of approving the appointment of an operator was left in the hands of the special committee, and this committee reported that the management of Lakeside had secured the services of Mr. Charles P. Hoover, assistant chemist at the Columbus water purification plant, who had obtained a leave of absence of two months in order to accept the management of the Lakeside plant. Mr. Hoover was personally known to one member of the committee and it was believed that he would be entirely competent to undertake the management of the Lakeside plant and to overcome such defects as might develop in same, and the residents of Lakeside would, during the coming season, for the first time in its history, be served continuously with a safe and satisfactory water.

The plant was operated during July and August with excellent results. The average daily consumption during that period was 125,000 gallons and the filtered water was at all times clear and sparkling and of good sanitary quality. Daily examinations were made by the chemist in charge and it may be stated that the plant received more careful attention than is common in plants of such small capacity.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR LISBON.

On June 8th, 1911, a representative from the engineering department, in response to a verbal request by telephone from the local health officer, visited Lisbon and collected samples from a test well which it is proposed to use as an additional water supply. The following report was submitted.

Lisbon is a farming community with a population of about 3,000, located in the central part of Columbiana County, of which it is the county seat. The site of the village and surrounding country is hilly. To the east of Little Beaver Creek, which flows through the eastern limits of the corporation, the hills rise to a height of 240 feet in a distance of approximately $\frac{3}{8}$ mile.

In the way of municipal improvements the village has approximately $1\frac{1}{2}$ miles of brick paved streets; several miles of sewers built on the combined plan, which discharge without purification into Little Beaver Creek; and a water works plant municipally owned and operated. The water works system comprises eleven drilled wells in the valley of Little Beaver Creek; a pumping station; a collecting reservoir of 70,000 gallons capacity; a distribution reservoir of 350,000 gallons capacity; and approximately seven miles of cast iron mains.

The pumping station is a substantial brick structure located on the west bank of Little Beaver Creek at the foot of Jefferson Street. The pumping machinery consists of two Erie City boilers of 125-horse power each; a horizontal duplex Dunn-Gordon air compressor with a nominal capacity of 635 cubic feet of free air per minute per 100 feet of piston movement per minute; and a Henry Worthington 75-horse power low service pump of the tandem duplex type, with a nominal capacity of 1,000,000 gallons in twenty-four hours. The discharge lift of this pump is 270 feet, and the suction lift approximately 4 feet.

Present Source of Supply. The present water supply is derived from eleven drilled wells, all located within a radius of 600 feet from the pumping station and in the valley of Little Beaver Creek. Seven of these wells are drilled to a depth of 120 feet and four to a depth of 285 feet. The formations penetrated consist of top soil, shale, and sand-

stone. Water is found in the sand-stone stratum at a depth of 85 feet. When not being pumped the water in the wells is 64 feet below the surface of the ground.

The water from these wells is pumped to the collecting reservoir by means of compressed air; and from the collecting reservoir it is pumped by the Worthington pump to the distributing reservoir. This reservoir is an uncovered structure, 50 feet square by 19 feet deep, located on a hill one-half mile east of the pumping station. It is constructed in excavation and lined with rough masonry.

There are 500 service connections, all of which are metered. The average daily consumption is 240,000 gallons or 580 gallons per service.

Proposed Additional Well. After several unsatisfactory attempts to derive water from additional wells, it was finally proposed to locate one on the ground of the Chestnut Street School in the eastern portion of the village. Near this site there are at present four houses having poorly constructed privy vaults 225 feet east of the proposed well, although the surface drainage from these houses is in the opposite direction. North of the site there are four or five houses within 350 feet, surface drainage from which is intercepted by Middlesite Creek. There is an abandoned gas well 175 feet northwest, which is at present uncovered and the casing so badly disintegrated that it cannot be removed. In its present state it is possible for surface drainage to enter at the top. There are also two other abandoned gas wells, one 225 feet west, and one 70 feet southeast of the proposed well, which were covered with soil and could not be inspected.

The proposed well is 8 inches in diameter and 275 feet deep, being cased to a depth of 35 feet. No accurate log of the well was kept, but as far as could be obtained the following formations were penetrated:

<i>Material Penetrated.</i>	<i>Thickness of Stratum.</i>	<i>Depth to Bottom of Stratum.</i>
Surface clay	20 feet.	20 feet.
Hard fine sand.....	30 to 40 "	60 "
Shale	5 to 10 "	70 "
Streak of coal.....	.5 "	70.5 "
Sand, fairly coarse.....	20 to 40 "	110.5 "
Shale	5 to 10 "	120.5 "
Coarse sand grading to finer.....	90 "	210.5 "

Pumping Test. Before pumping the normal water level in the well was 19 feet below the surface. After continuous pumping for six days at the rate of about 80,000 gallons per twenty-four hours, the water level was reduced to 47 feet below the surface. The water is said to be derived from the strata at depths of 60, 110 and 210 feet. The pumping test was made by means of compressed air. So far as could be learned the test had no effect upon the level of the water in the nearby wells.

Quality of Water. As indicated by the results of the analyses of samples collected by a representative of the Board, the water is fairly satisfactory from a sanitary and physical standpoint. The water is somewhat hard, however, and there is enough iron to cause a slight turbidity unless means are taken for removing it.

CONCLUSIONS.

In approving the proposed site for the new well it should be remembered that while the present well may be passable, yet the area available is too limited to permit any considerable development in the same locality; and furthermore, the site is undesirable on account of its distance from the present pumping station. In view, however, of the difficulty of obtaining sufficient water in Lisbon, and the urgency of an immediate increase, it is believed that the Chestnut Street well could at least be temporarily approved for a certain period, with the understanding that the Board is to investigate and act upon the matter again at the end of such period.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the 8-inch well, located on the grounds of the Chestnut Street School, Lisbon, as an additional source of water supply until July 1st, 1913, provided:

- 1st. That no new well be located on this site without first receiving the approval of the State Board of Health;
- 2nd. That all abandoned gas wells within 300 feet of the well be filled with concrete, and that the State Board of Health be notified that this requirement has been fulfilled by your board;
- 3rd. That all privy vaults within 300 feet of the well be made and maintained watertight and that council file with the State Board of Health a copy of the ordinance requiring that this be done; and,
- 4th. That the top of the proposed well be protected from the entrance of any surface water.

The authorities were urged to take up the question of improved water supply on a broader basis with the idea of going outside the village, if necessary and obtaining a suitable and permanent supply.

REPORT ON PROPOSED NEW WATER SUPPLY FOR LODI.

On January 12, 1911, plans for a proposed new water supply for Lodi were submitted by Mr. L. E. Chapin of Canton, consulting engineer for the village. Some weeks later, further information was obtained from the consulting engineer on one of the standard proposed

water supply blanks of the State Board of Health. The plans and other information having been referred to the engineering department, on February 16, 1911, one of the assistant engineers visited Lodi and in company with Mr. F. R. Loomis, member of council, inspected the proposed development. The following report was submitted:

Lodi is a village of about 1000 population and is located in the southern portion of Medina County near the headwaters of the Black River. The southwesterly portion of the village is rather flat, but the northeasterly portion is on a side hill which rises from 50 to 100 feet above the average elevation of the central portion of the town. Lodi is primarily a trading center for farmers and contains no important industries. Neither are there any municipal improvements with the exception of an inadequate public water supply, described below.

The underlying rock in this vicinity is the Cuyahoga shale, which is covered with drift deposits of glacial origin varying in thickness from 50 to 100 feet. The drift is of a clayey nature in some portions; but in others, especially in the lowlands, it is of a gravelly nature and furnishes an ample supply of water for private dug wells, of which there are about 100 in the village. In the higher portions of the village, the water is obtained by means of drilled wells, which penetrate the shale formation.

Present Public Supply. Somewhat over ten years ago, water works were installed in Lodi, which were given to the village by a public spirited citizen. The works were installed under the supervision of the present consulting engineer of the village, although there is no record of the plans having been submitted to the State Board of Health for approval.

The present supply is obtained from a well or reservoir of some 60,000 gallons capacity, which is fed by springs entering it through the bottom. The elevation of the reservoir is such as to afford a gravity supply. The distribution system has a total length of one and one-fourth miles and includes 2250 feet of 8-inch cast iron pipe; 330 feet of 6-inch cast iron pipe; and 3950 feet of 4-inch cast iron pipe; together with sixteen fire hydrants. There are about forty services, which supply some twenty per cent of the population, and the water is used for general domestic and drinking purposes. The supply, however, is entirely inadequate in quantity; hence, the necessity for obtaining a new supply.

Proposed New Supply. The new supply will provide for furnishing water for the entire village, although the old supply, described above, will be retained for emergency use and fire protection.

The new supply is designed on a basis of furnishing 100,000 gallons per day, or 100 gallons per capita, although it is estimated for some unstated reason that but half the population, or 500 people, will use the supply, and that 30,000 gallons will sufficient for some years to come.

The plans submitted contemplate securing a supply by constructing a shallow impounding reservoir upon a small stream one and one-half miles north of the center of the village, such reservoir being high enough to supply the village by gravity. In addition, the distribution system is to be enlarged by adding three and one-half miles of mains varying from four to six inches in diameter.

It is expected to utilize not only the flow of the stream on which the reservoir is to be located but also the discharge of some springs on the watershed, known as the Prouty and Feazle springs.

A careful inspection of the watershed above the reservoir, which has an area of about 116 acres, was made by the assistant engineer of the Board. With the exception of one school house at the upper end, there are no dwellings on the watershed. A sugar camp, however, is located near the upper end, and on account of the absence of sanitary conveniences at this camp, it might prove quite as dangerous as a number of ordinarily constructed farm houses. The topography of the watershed is rolling and consists of about twenty-five per cent woodland and seventy-five per cent cultivated fields. The assistant engineer failed to locate any springs which in his opinion were worthy of consideration as a partial source of supply. It is proposed to purchase only sufficient area to permit of the construction of the reservoir, and there is apparently no thought of taking steps to control the tributary drainage area.

The reservoir itself is to be formed by placing an earthen dam across the valley of the small stream above mentioned and by constructing an earthen dike or continuation of the dam around the southerly and westerly sides of the reservoir. The combined length of the dam and dike is 1600 feet and the maximum height is 18 feet. The reservoir will cover an area of about nine acres and when full will have a capacity of 20,000,000 gallons. The reservoir site is to be excavated in order to afford greater storage, and this of course will remove objectionable vegetable matter. Even with this excavation, however, over forty per cent of the total area of the reservoir will have a depth of less than 5 feet, while the approximate average depth of the entire reservoir is but 7 feet.

Assuming a 12-inch annual run-off on the watershed, the total annual yield would be 45,000,000 gallons. The evaporation, however, from nine acres of reservoir surface will be great, and furthermore, the percolation through 1600 feet of earthen dike, especially the first few years, will be still greater. It seems very doubtful, therefore, in the minds of the engineering department of the State Board of Health whether the supply will be adequate in quantity.

The storage of water in this shallow reservoir will be subject not only to the possibility of pollution from the sugar camp or from other

temporary inhabitants of the watershed, but will also doubtless be of unsatisfactory physical character due to biological growths at some seasons and excessive turbidity at other seasons.

A sample of water was collected from the stream, but the analysis is not yet available. However, analytical results from a chance sample of this surface water would be of little value. The question should be decided on the basis of the physical conditions affecting the water.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health considered the new source of water supply proposed for Lodi, as shown on plans submitted by Mr. L. E. Chapin, consulting engineer, January 12th, 1911, and it was disapproved unless a filtration plant of a design satisfactory to the State Board of Health be included in the plans, and approval was withheld until:

1st. Thorough investigations have been made with reference to securing a suitable ground water for the village; and,

2nd. The consulting engineer has made a careful investigation and report to the Board of the yield from 116 acres of watershed from which it is proposed to furnish a supply of 100,000 gallons per day; such investigation to include observations of the flow of the proposed springs as well as the average dry weather flow of the small streams upon which the impounding reservoir is to be located.

On September 14th, 1911, there was received from the National Company, contracting engineers for the village of Lodi, a request of approval of a proposed new water supply to be obtained from wells on a site known as the Cleveland, Southwestern and Columbus Railway property. Previous to the receipt of this request, the assistant engineer visited Lodi on August 1st, 1911, and inspected the proposed site and collected samples to determine the quality of the water. In connection with preliminary examinations for a proposed water supply, Lodi has also been visited by representatives of the engineering department on June 7th, 1911, and on August 22nd, 1911. The following report was submitted:

The village of Lodi contracted with the National Company, of South Bend, Indiana, to install a water works system and began search for a suitable ground water supply. A test well was drilled near the Black River about 0.9 mile west of the village. This well was examined and sampled by the assistant engineer on June 12th, 1911. From a sanitary point of view the location of the well is satisfactory, and the analysis of the water showed excellent hygienic properties. The mineral content was, however, found to be objectionable, especially as regards

the iron content and hardness, and it was advised that further efforts be made to secure a more satisfactory water.

Shortly afterward, a second well was drilled in the extreme southern portion of the village on property owned by the Cleveland, Southwestern and Columbus Railway. This well was examined and sampled by the assistant engineer on August 1st, 1911. It was found that the site was suitably located and the analysis of the water was entirely satisfactory from a sanitary standpoint. The iron content was, however, found to be objectionably high. It was again urged that the village make further search for a more satisfactory ground water.

On August 22nd, 1911, one of the engineering assistants sampled several private wells located south of the village. The analyses of these samples in each case showed the presence of excessive iron, and in a letter to the village authorities it was pointed out that little hope could be entertained of securing an iron-free water.

Proposed Source of New Water Supply.

Having in their possession the facts revealed by the preliminary examinations in the search of a ground water supply, the village officials propose to obtain a supply from wells located upon the property of the Cleveland, Southwestern and Columbus Railway, in the extreme southern portion of the village. Plans for the development of the supply have as yet not been completed, and it has not yet been decided to include an iron removal plant.

The site selected has a very favorable location for water works purposes. The surface surroundings are entirely satisfactory and there are no dwellings within a radius of 500 feet or more. The site lies between the old tract of the B. & O. Railroad and the present right of way of that railroad, the presence of which will no doubt discourage building operations in the vicinity in the future. A test well on the site extends to a depth of 85 feet and penetrates the following formations:

Yellow clay	10 feet.
Blue clay	8 "
Sand and gravel.....	2 "
Tough blue clay.....	27 "
Hardpan	3 "
"Slush" sand	10 "
Sand and gravel (waterbearing).....	25 "

The waterbearing stratum, it will be seen, is amply protected by layers of impervious clay, and the water is thus held under artesian pressure which causes it to rise to an elevation of 7 feet from the surface. No pumping test to determine the quantity of water available has as yet been made, but such is not considered necessary owing to local knowledge of the abundant yield of the waterbearing stratum.

Quality of Water.

In an appended table are presented the results of analyses of samples of water collected from the test wells and various private wells, to indicate the quality of available ground water. It will be noted that the analyses indicate in general that the ground water is of excellent quality, containing no evidences of polluting influence. All of the analyses, however, exhibit the same objection in the excessive iron contained. The waters are, moreover, excessively hard, although the analysis of the sample from the well on the Cleveland, Southwestern and Columbus property is more favorable in this respect. There is little likelihood of reduction in the iron content with continued pumping owing to its general presence in the vicinity. To avoid the staining of plumbing fixtures, fabrics, etc., in its use, it will be necessary to improve the quality of the water by the installation of a properly designed iron removal plant.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health considered the question of a new water supply for Lodi, to be obtained from drilled wells located on the property of the Cleveland, Southwestern and Columbus Railway, situated in the extreme southerly portion of the village, and this source of supply was approved upon the following conditions:

- 1st. That an iron removal process be installed to improve the quality of the water;
- 2nd. That detailed plans for the development of the supply, including the iron removal plant, be submitted to and receive the approval of the State Board of Health; and,
- 3rd. That this approval be void unless construction shall have been commenced before January 1st, 1912.

On October 31st, 1911, there was received from Mr. George A. Harrop of the National Company of South Bend, Indiana, contracting engineers for Lodi, a communication proposing a change in obtaining the water supply for the village. An inspection was made on November 1st by one of the engineering assistants and the proposed new supply examined. The following report was submitted:

In the development of the supply there was to be included a receiving well, 20 feet in diameter and 16 feet deep, designed to receive and store the artesian flow from drilled wells and serve as a pump well. In the excavation for this well a large flow of water was encountered at a depth of about 10 feet from the surface in a porous waterbearing gravel formation. The yield of this stratum appeared to be so great that it was decided by the village authorities and their engineers to use it in preference to the deeper seated water obtained by drilled wells.

The formations penetrated in making the excavation were 3 feet of muck; 5 feet of hard clay; the remaining depth extending into the waterbearing gravel. The water rises under some artesian pressure to about 7 feet from the surface and the estimated available yield is 200,000 gallons per twenty-four hours.

Quality of Water. Two samples were collected on November 1st to represent the quality of the water obtained from the collecting well excavation. The analyses of these samples indicate that the water is in all respects similar to the water obtained from the deeper horizon by means of drilled wells. It contains a somewhat higher iron content and is excessively hard. In sanitary features it is entirely satisfactory, and the analyses contain no evidence of organic contamination. The bacterial content is satisfactory.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the Board considered the question of the proposed change in obtaining a new water supply for Lodi from a dug well on the property of the Cleveland, Southwestern and Columbus Railway, submitted in a communication from the National Company of South Bend, Indiana, under date of October 31st, 1911.

This proposed change was approved upon the following conditions:

1st. That an iron removal process be installed to improve the quality of the water;

2nd. That detailed plans for the development of the supply, including an iron removal plant, be submitted to and receive the approval of the State Board of Health;

3rd. That the council and the board of trustees of public affairs of the village take immediate steps to pass such ordinances or regulations as will effectually prevent further contamination of the district occupied by the water supply wells and file a copy of same with the State Board of Health; and,

4th. That this approval be void unless construction shall have been commenced before January 1st, 1912.

On December 19th, 1911, plans for a proposed deferrization plant for Lodi were submitted by Mr. Philip Burgess, consulting engineer for the village. These were referred to the engineering department and the following report was submitted:

In accordance with the conditions of approval of the Board of September 14th, 1911, an iron removal plant is to be constructed to improve the quality of the water. In brief, the plant will consist of an aerator, settling basin, two gravity mechanical filters, and a clear well for the storage of the purified water. The plans of the engineer show

the general features of the plant, but do not include the clear well, provision for which has not as yet been made. With the present progress of construction, the source of supply consists of a circular concrete well, 20 feet in diameter and 16 feet deep, which was originally intended as a pump well. Owing to the presence of abundant water at a shallow depth, however, it is the intention to use this well as a source of supply. If this is done a new clear well must be constructed.

Character of Water to be Treated. Samples of water obtained from the dug well were collected by representatives of the State Board of Health on November 1st, 1911. The analyses showed the presence of 3.7 and 3.2 parts of iron, respectively, but indicated only a small organic content. Samples from a drilled well on the property were taken on August 1st, 1911, and the analyses showed the presence of 2.4 parts of iron, but indicated a low organic content. The samples when collected were all clear, but had a turbid appearance when received at the laboratory of the State Board of Health. To all appearances the water contains iron in such a form as to admit of easy removal by simple oxidation and clarification. It is with this assumption that the proposed plant has been designed.

Aerator. The water from the dug well, or drilled well, if this be used, will be pumped into an aerator for the purpose of oxidizing its iron content. The aerator is constructed of five layers of coke, each 8 inches in thickness, supported on galvanized iron wire screens. Each screen and layer of coke is 7.5 feet square and the screens rest on supports one above the other so that the total depth of the aerator is 7 feet. The coke to be used in the aerator will vary in size from 3 inches to 1½ inches. A preference will be given to coke containing iron in order to promote oxidation. The water pumped to the aerator will be applied at the top by means of a suitable distributing device. The design of the aerator provides a rate of 21.3 cubic feet per square foot per hour, or 167,000,000 gallons per acre daily, based upon a rate of pumping of 150 gallons per minute.

Settling Basin. The settling basin, one end of which will be directly under the aerator, is designed to intercept a portion of the precipitated iron. The basin is of concrete construction, rectangular in plan, with dimensions of 14 by 7.5 feet, and is 6 feet deep. Its capacity of 4700 gallons, corresponds to a period of flow of 30 minutes. A hanging baffle is placed across the basin and by this means a fairly complete displacement will take place. The plans show no details as to the method of draining the basin, but these will be provided by the engineer. The effluent from the basin flows over weirs to the filters.

Filters. Two filters of gravity mechanical type are provided for the final clarification of the water. These filters are each 6.5 by 10 feet and the total area is 130 square feet. At the rate of 150 gallons per

minute, the filters will operate at 72,000,000 gallons per acre in 24 hours. The filtering material will consist of 2 feet of sand, with an effective size of about 0.35 m. m. The strainer system is of the usual type consisting of perforated pipes. The effluent drained from the filters will discharge into the clear well. The filters will be washed by back flushing through the strainers at a rate such as to give a vertical rise of 12 inches. Gutters extending across the filters will provide means for the removal of the wash water.

Clear Well. As has been stated, the plans contain no provision for a clear well and presumably this is to be left to the discretion of the village or the contractor. It should be noted that there is already available a partially completed clear well, which is now intended to be used as a source of supply. From the standpoint of economy of construction, and considering the greater desirability of using a water from a deeper source, it appears advisable that the village abandon the shallow source approved on November 21st, and adopt the source approved on September 14th, from drilled wells. This procedure will insure the safety of the supply from a sanitary standpoint and will also provide for the use of the partially constructed well to receive the filtered water.

ACTION OF THE BOARD.

At a meeting held January 17th, 1912, the State Board of Health approved the plans for a proposed deferrization plant for the village of Lodi, submitted by Mr. Philip Burgess, consulting engineer, on December 19th, 1911, upon the following conditions:

1st. That the aerating device be enlarged or otherwise modified if in the opinion of the State Board of Health such enlargement or modification becomes necessary;

2nd. That samples of the filtering material be submitted to and approved by the engineer of the State Board of Health before being placed;

3rd. That the village appoint a competent man to operate the plant; and,

4th. That this approval be void unless construction shall have been commenced prior to May 1st, 1912.

The Board advised that in the operation of the plant, in washing the filters, the wash water be applied at such a rate as to give vertical rise of at least 18 inches per minute.

The Board also advised that the water supply obtained from drilled wells, as approved September 14th, 1911, be used in preference to that obtained from a dug well as approved November 21st, 1911, for the following reasons:

1st. The safety of the drilled well supply from contamination

would be insured, whereas the dug well supply must be considered with suspicion; and,

2nd. The use of the drilled well supply will admit of economy of construction by the use of the already partially built concrete well as a clear water basin.

EXAMINATION OF WATER FROM LODI.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10371	1911 June 12	6	7	none	none	.55	.046	.662	0	.4
10566	Aug. 1	2	13	distinct	sl. veg.	0.39	.054	.650	0	.12
10565	Aug. 1	7	15	distinct	none	0.0	.010	.160	0	.12
10677	Aug. 22	13	11	distinct	none	2.94	.052	1.984	trace	0
10678	Aug. 22	12	15	distinct	none	0.29	.040	.116	trace	0
10679	Aug. 22	7	8	slight	none	0.0	.004	.178	trace	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10371	21.5	224	197.5	.....	812	82	1.3	10	Not in 10 cc.
10566	6.	268	310.	.....	1059	124	1.5	5	Not in 10 cc.
10565	6.	240	32.5	.....	318	27	2.4	6	Not in 10 cc.
10677	11.	232	none	.....	279	29	3.0*	3	Not in 10 cc.
10678	6.	245	77.5	.....	380	31	2.5*	0	Not in 10 cc.
10679	10.	230	27.5	.....	312	27	1.7*	60	Not in 10 cc.

Source of Samples.

No. 10371. Test well near Black River west of village.

No. 10566. Test well near Black River west of village.

No. 10565. Test well on property of the Cleveland, Southwestern & Columbus Railway.

No. 10677. Private well at celery house south of village.

No. 10678. Private well at Chapman storage house south of village.

No. 10679. Drilled well at old B. & O. depot south of village.

*Iron in solution: No. 10677, 0.7; No. 10678, 0.5; No. 10679, 0.5.

REPORT ON PROPOSED ENLARGEMENT OF WATER FILTRATION PLANT AT LORAIN.

On June 29th, 1911, there was received from Mr. William E. Knight, director of public service, Lorain, plans showing proposed additions to the city's water filtration plant. These plans were referred to the engineering department and the following report submitted:

Lorain, located on Lake Erie some 25 miles west of Cleveland, is one of the most rapidly growing cities in the state. Its population has increased from about 15,000 in 1900, to 30,000 at the present time. The problem of increasing the capacity of the water works to correspond with the population is a difficult one.

Lorain was one of the first municipalities in the state to install a mechanical filtration plant. This plant, consisting of six Jewell filters, was constructed in 1897, and was approved by the State Board of Health on condition that the maximum rate of filtration be limited to 100,000,000 gallons per acre per day and that 2.5 grains of alum be used.

This plant, though having a nominal capacity of 3,000,000 gallons, in a few years proved inadequate, both on account of the design and on account of the increased water consumption in the city. Furthermore, it was used during a considerable period for purposes of experimentation with the "Jewell Iron Process," and later with the lime and sulphate of iron process, it being one of the first plants to use the last named chemicals as coagulants.

In 1905 the city contracted for the installation of a new mechanical filter plant of concrete construction, designed along more modern lines. A full description of this plant, as well as of the old plant, has been published in the special report of the State Board of Health of 1908, on "Water and Sewage Purification in Ohio." It will not be necessary, therefore, to include a description of the plant in this report.

In connection with the proposed plan for enlargement, however, attention should be called to the results of the detailed investigation by the State Board of Health, during the years 1907 and 1908, relative to the efficiency of the new plant. These results showed conclusively that the principal fault of the plant consisted in the inadequate size and unsatisfactory design of the coagulation basins which seldom, if ever, accomplished as much work as they should, in preparing the water for application to the filters. These conditions have necessitated during the past three or four years, the use of abnormally large amounts of coagulants, and even then have probably prevented the obtaining of as high a degree of purification in the filtered water as might have been obtained with larger preliminary basins.

It is therefore now proposed to construct, on the shore adjacent to the northerly side of the existing filter plant, a large uncovered sedimentation and coagulation basin. This basin will be of reinforced concrete construction and will be designed so that the sludge can be readily drawn off into a pump well, from which it will be forced out into the lake. The average depth of the basin will be 10 feet, and the over-all dimensions 175 by 90 feet, thus giving a capacity of 1,000,000 gallons. It will be divided into two compartments, each 44 by 175, and each of these will contain a longitudinal baffle, in the center, which will cause the water to travel about 350 feet in its passage through each division. With the present daily consumption of 4,000,000 gallons, the new basins will furnish at least a six-hour sedimentation and coagulation period, while under present conditions there is available, theoretically only a three-hour storage; and on account of the design of the present basins, it is probable that most of the water remains in them less than one hour.

It might be mentioned that the proposed construction will allow the old coagulation basins to be used as an additional clear well, which would be very desirable, because the rate of filtration would not then need to be varied as the rate of consumption increases or diminishes during the day.

In addition to constructing the above described basins, it is proposed to build a new pump room at a lower level than the present one, in order that the centrifugal pumps may operate with a low suction lift instead of with an 18-foot lift, as is the case at present. This pump room will consist of a building 60 by 42 feet, and will join the present pump building on the northerly side.

Furthermore, it is proposed to install a new apparatus for applying the coagulant in dry form. This is known as the "Earl" type, and is said to be in use at New Orleans. It is a patented device. The apparatus is so designed that the dry chemical can be applied automatically in direct proportion to the rate of flow of the incoming raw water, the basis of regulation being the varying difference in pressure at the throat and at the upper end of a Venturi meter tube. The chemical is placed in solution just before being introduced into the raw water by being forced by a jet of water into an equalizing drum. From inspecting the detailed drawings of the apparatus there seems to be no reason why it should not work satisfactorily. In any case the existing apparatus will not be abandoned and can be placed in use at any time needed.

Relative to the present practice of using the coagulant at Lorain, the director of public service reports that lime and iron are used for three or four consecutive weeks and then alum is used for a week or two. The reason for this is that the lime causes deposits in the filter piping; but by the use of alum, these deposits are removed in a few days. It is expected that when the new basin is completed, the necessary

amount of coagulant will be greatly reduced, the reaction will be more complete, and the trouble from lime deposits will be eliminated.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the plans for proposed enlargement of the Lorain water purification plant, as shown on drawings submitted by Mr. Wm. E. Knight, director of public service, June 29th, 1911, upon the following conditions:

1st. That if the device for applying the coagulant in a dry form, or any other part of the apparatus, should prove unsatisfactory when put in use, the State Board of Health will require that such changes be made as may be necessary to comply with standard practice in mechanical filtration; and,

2nd. That this approval shall be void unless construction is begun before January 1st, 1913.

REPORT ON PROPOSED WATER SUPPLY FOR LOWELLVILLE.

On February 15th, 1911, there were submitted by Mr. John P. Bracken, vice president of The Lowellville Water Company, and Mr. J. Richard Kommer, engineer for said company, plans for proposed water supply for the village of Lowellville. In anticipation of these plans being submitted, a representative of the engineering department visited Lowellville on November 9th, 1910, and collected a sample from the proposed source of supply. The plans were referred to the engineering department and the following report was submitted:

The village of Lowellville, having a population of 1592, is located on the Mahoning River nine miles below Youngstown and one mile from the Pennsylvania state line. The village at present has practically no municipal improvements other than a few storm water sewers and electric lights. Most of the citizens are employed in the steel mills located in the Mahoning Valley, although the village itself has no important industrial establishments. The village occupies the valley on both sides of the river as far back as the foot of the steep hills which are located on either side.

It is proposed to derive the supply from flowing wells located about one and one-half miles north of and some 250 feet above the elevation of the village. There are to be used six drilled wells 75 to 90 feet and cased to the bottom with 5½-inch pipe. One of the wells has already been completed and all of them will be located within 300 feet of each other. The formations penetrated by the test well are as follows:

Soil and surface clay.....	38 feet.
Shale and fire clay.....	16 "
Gray sandstone	21 "
Sand and gravel.....	3½ "
Gray sandstone.....	13 "

When the test well had been sunk 56 feet, the water flowed under artesian pressure, and after penetrating 80 feet a much stronger flow, amounting to over 50,000 gallons per day, occurred. By means of a pump, 80,000 gallons per day were extracted from the test well, during which time the water was lowered four feet below the top of the casing.

Around the top of each well is to be constructed a circular concrete manhole 7½ feet in diameter, which will protect the wells from surface pollution. A cast iron manhole cover with a special opening will permit of taking samples of the water with minimum opportunity for polluting the supply. The wells are all to be located within 300 feet of each other, as already mentioned, and their 4-inch outlet pipes will connect into an 8-inch cast iron gravity main extending southward 5600 feet to two steel storage tanks located on the brow of a hill 200 feet above the village and having a combined capacity of 750,000 gallons.

From the storage tanks, the 8-inch main is continued to the village where it connects with a distribution system of liberal design consisting of 9185 feet of 8-inch cast iron pipe; 12,420 feet of 6-inch cast iron pipe; and 6930 feet of 4-inch cast iron pipe. There are to be 50 4-inch double fire hydrants and one watering trough. It is expected that connection will be made to 100 private dwellings, four hotels, and five business blocks. All services will be metered. It is expected that 100 pounds fire pressure will be obtainable.

Referring to the sanitary quality of the water, it should be mentioned that the nearest building, which is an isolated farm house, is 1000 feet from the southerly well and 800 feet from the edge of the area which it is proposed to use in the future. There are no other buildings within half a mile.

Analysis of the sample of water from the test well, collected by a representative of the State Board of Health, shows it to be of excellent sanitary quality, although it contains a slightly greater amount of alkalinity than would be desirable. On the other hand, the incrustants are practically absent.

It should be stated that no definite information was obtained regarding the present authority of The Lowellville Water Company to introduce a public water supply for the village, although it was understood from local officials that a franchise had been granted, or at least that such would be the case soon.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health approved the plans for a proposed water supply for the village of Lowellville, to be derived from flowing wells located about $1\frac{1}{2}$ miles north of and some 250 feet above the elevation of the village, as shown on drawings submitted February 15th, 1911, by Mr. John P. Bracken, vice president of the Lowellville Water Company, and Mr. J. Richard Kommer, engineer for the company, upon the condition that the supply be installed before January 1st, 1913.

EXAMINATION OF WATER FROM LOWELLVILLE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10018	1910 Nov. 9	2	trace	none	none	.05	.054	.160	0	0
10017	Nov. 9	2	trace	none	sl. musty	.05	.070	.712	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10018	3	256	10	.....	293	35	.4	15	Neg. in 10 cc.
10017	3	270	none	.....	325	35	.4	6	Neg. in 10 cc.

Source of Samples.

10018. Six-inch drilled test well on Stoner farm, proposed for public supply.

10017. Private drilled well on Stoner farm, 4,000 feet south of test well.

REPORT ON PROPOSED WATER SUPPLY FOR MALVERN.

On August 29th, 1911, in response to an application from Mr. J. G. Murdock, village clerk, a member of the engineering department visited Malvern for the purpose of investigating the proposed site for the lo-

cation of public water supply wells. The following report was submitted:

Malvern is a village of about 750 population, located in the north-western part of Carroll County on Big Sandy Creek, a branch of the Tuscarawas River.

The area of the village, within the corporation limits, is about 275 acres. Considerably over half of this area is unimproved, the built up portion of the village being rather thickly settled for a small village.

The village lies in a long narrow valley, with hills on the north and south which rise to a height of 100 to 150 feet above the extreme northerly part, is very flat. The Big Sandy Creek flows west through the northerly part and an old canal, now used as a mill race, parallels this creek a short distance to the north. The southerly part of the village is drained by a small intermittent stream, called Pipes Run.

The geology shows the valley in which the village lies to be covered with extensive alluvial and drift deposits, which are composed of layers of sand and gravel and quicksand in the northerly part, and a mixture of clay and sand in the southerly part. It is thought that these deposits are underlaid with limestone rock at a depth of about 100 feet. The limestone, however, has never been encountered by local drilling. On the hills is found the following approximate section:

Surface soil	5 to 10 feet.
Shale	10 to 20 "
Sand rock	10 to 20 "
Shale	6 to 10 "
Coal (No. 6).....	2½ to 3 "
Fire clay	6 "
Coal (No. 5).....	3 to 4 "
Clay	14 to 16 "
Coal (No. 4).....	2 "

The upper two veins of coal are mined in sufficient quantity for local use, while the clay is mined extensively for tile brick manufacture.

The village has no sanitary sewers. Privy vaults, which are loosely constructed of brick and are open at the bottom, are in use throughout the village. Four storm sewers, with a total length of about ¾ mile, drain the principal streets.

The water supply of the village is at present derived entirely from shallow private wells. Most of these are dug to a depth of 15 to 20 feet into the sand and gravel. There is no ordinance regulating the distance between the wells and privy vaults.

Proposed Water Supply. In 1908 Mr. L. E. Chapin, engineer, was retained by the village to prepare plans for a public water supply. Nothing further was done, however, toward the development of the supply

at that time. It is now proposed to submit the question of a bond issue for a water works to a vote of the citizens, on November 7, 1911, and the same engineer has again been retained.

Site "A". The proposed site for the location of wells, which is now submitted for the approval of the Board, is located on land owned by Mr. P. M. Cowles, in a northeasterly direction from the built up portion of the village, within the corporation limits. It is proposed to construct the pumping station on rather low ground at a point about 200 feet south of Big Sandy Creek. The wells, six in number, are to be drilled in two lines, 100 feet apart, extending from the pumping station to a point just north of the river. There are no buildings to the north, east or west of the site, and the nearest habitations to the south will be at a distance of 500 to 600 feet from the nearest well. The site will not be encroached upon in the future, as the land in the vicinity is overflowed at times of high water. If sufficient care is taken to effectively seal the top of the wells against surface drainage at times of flood stages in the river, the site should be considered a favorable one from a sanitary point of view. The formations at the site are extensive deposits of sand and gravel and quicksand, which give evidence of supplying water of an excellent quality and adequate quantity.

Site "B." Another site was inspected during the recent visit, which site the village officials propose as an alternate choice in case the first site is disapproved. This site is located just outside the corporation limits of the village to the northeast, on the farm of Henry Ebner. This land lies just north of the old canal which is now used as a mill race. The only house within a distance of about 1000 feet of the site is a farm house, about 300 feet away. The ground at the site is never overflowed, and the formations are the same as at Site "A," namely, sand and gravel. This site is entirely satisfactory from a sanitary point of view. The engineer for the village, however, prefers Site "A" as being more desirable from a mechanical standpoint in designing the distribution system.

Quality of Water. During the visit a sample of water was secured from a private well located near Site "B." This well is driven 65 feet into the sand and gravel, and the analysis, therefore, probably corresponds closely with that which may be expected from the proposed supply. The results of the analysis indicate that the water is of excellent quality from a sanitary standpoint. The water is comparatively soft and contains no incrusting constituents. The iron content, however, which is 0.6 part per million, is sufficient perhaps to cause a slight discoloration of plumbing fixtures.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health considered the sites "A" and "B" for public water supply purposes

for the village of Malvern, as shown on plan received on September 11th, 1911, which is on file in the office of the State Board of Health.

These sites were approved provided that, by means of test wells, it is shown that water of sufficient quantity and of quality satisfactory to the State Board of Health can be obtained.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR MILLERSBURG.

In response to a communication from Mr. S. H. Marchand, mayor of Millersburg, a representative of the engineering department visited that village on January 17, 1911, to inspect a recent addition to the public water supply. The following report was submitted:

The village of Millersburg, having a population of 2,020, is located in the central part of Holmes County on Killbuck Creek. It is essentially a farming community and has no important manufacturing industries. The village has a few paved streets, several sewers, and a public water supply which has been installed several years and is used by about eighty-five per cent. of the population.

The geological formation of the higher portions of the village consists of surface clay, hardpan, and sandstone. The valley of the creek, however, is distinguished from the country on each side of it by an abundance of drift material consisting of sand and gravel interstratified with thin sheets of hardpan.

The present water supply is obtained from a large dug well in the valley of the creek, which penetrates the glacial drift. The supply has been found to be of excellent quality and until recently yielded a sufficient quantity. The increased consumption, however, now demands the installation of an additional well.

Another dug well, therefore, known as well No. 2, has been located about 100 feet west of the original well and a short distance north of the village. The site of the well is free from surface contamination, and the nearest buildings are about 400 feet distant on the opposite side of the creek. The new well is 25 feet deep and penetrates the following formations:

Fine sand	14 feet.
Fine gravel	4 "
Hardpan (impervious)	1 "
Coarse gravel (waterbearing).....	1 "

The well is lined with a 17-inch masonry wall, which rests on a concrete footing 2 feet wide. The top of the wall extends 6 feet above the surface of the ground and is covered with a conical wooden roof with screened air vent.

It was observed during construction that the water appeared to enter the well from the northwest. At the time of inspection, the water stood 4 feet below the surface of the ground. Continuous pumping for twenty-four hours, during which time 400,000 gallons of water were drawn out, lowered the surface of the water 10 feet. As the average daily consumption of the village is less than 400,000 gallons, it is safe to assume that the new well in connection with the old one will afford a sufficient quantity.

Quality of Water. The quality of the water from the new well, as indicated by analysis of a sample collected by a representative of the engineering department, shows it to be satisfactory from physical, chemical, and bacterial standpoints. An exception to the statement might be made in that the alkalinity is somewhat higher than desirable, although it is no higher than would be expected from a ground water derived from the locality of Millersburg. The construction of the well will adequately protect the water from accidental surface pollution, and there is no opportunity for contamination between the well and the consumer. The water is pumped directly into the distribution system, under an average pressure of 40 pounds, which in case of fire can be increased to 100 pounds.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health considered the application for approval of a recently constructed dug well to be used as an additional water supply for Millersburg, said well being located in the valley of Killbuck Creek just north of the village and about one hundred feet west of the original source of supply and the same was approved as an additional supply.

EXAMINATION OF WATER FROM MILLERSBURG.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
7568	1908 May 13	none	none	none	none	.10	.004	.008	.016	none
10119	1911 Jan. 17	6	none	none	none	.10	.030	.048	none	none
10120	Jan. 17	2	none	none	none	.10	.020	.030	.001	none

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
7568	4.3	186	none	.....	328	54	0.1	25	Not in 50 cc.
10119	5.0	174	30	.....	257	24	0.3	100	Not in 1 or 10 cc.
10120	5.0	176	52.5	.....	279	34	0.2	120	Not in 1 or 10 cc.

Source of Samples.

7568. Water works dug well No. 1.

10119. Dug well No. 2, at pumping station (additional supply well).

10120. Two dug wells; sample from pumping station.

REPORT OF PROPOSED WATER SUPPLY FOR MINSTER.

On January 15th, 1910, there was received from Mr. Samuel S. Wyer of Columbus, engineer and contractor for the proposed Minster water works, a plan showing the location of a proposed well and pumping station. Based on this plan, together with analytical and other information previously obtained by the engineering department, a report was submitted to the Board at its meeting on January 20th, 1910, and the proposed site was approved upon the following conditions:

"1st. That sufficient land be owned or controlled by the village to prevent the location, within 300 feet of any public supply well of any building or habitation other than those necessary for water works purposes;

"2nd. That before any well is placed in service a pumping test be conducted in the presence of a representative of the State Board of Health for the purpose of giving an indication of the yield of the well and to permit of the collection of representative samples; this approval to be contingent both upon a satisfactory yield and upon a satisfactory quality of water;

"3rd. That full detailed plans and specifications for the development of the supply be submitted within sixty days following the definite selection of the source of supply; and,

"4th. That the condition of this approval be considered void unless the before mentioned pumping tests shall be conducted by July 1st, 1910."

Shortly after this approval was given it was decided by the engineer and contractor to change the site of the well from that first proposed to a public park near the corner of Columbia and Zweibrucken streets. This site was informally approved in a letter from the Secretary of

State Board of Health to the mayor of Minster under date of February 4th, 1910, stating that "we are willing to recommend for the approval of the State Board of Health this well as a source of public supply provided a suitable pumping test indicates a sufficient yield and proves the water to be of satisfactory quality from a sanitary point of view."

Following the receipt of this letter, construction of the water works was commenced and completed within a few months. The works consist of a motor driven deep well pump; an elevated steel tank, 150 feet high and holding 50,000 gallons; and a distributing system composed of 2,000 feet of 6-inch pipe and 15,000 feet of 4-inch pipe.

The public park referred to is about 400 feet long and 150 feet wide. The nearest privy is about 250 feet from the well and there are two stables about 150 feet away. The well, however, is 255 feet deep and penetrates some 80 feet of clay, under which is the limestone rock from which the water is obtained. The well is 8 inches in diameter and cased to a depth of 110 feet.

On August 16th, 1910, following a thorough pumping test of the well which showed that it could produce sufficient quantity of water for the immediate needs of the village, a sample of water was collected by a representative of the engineering department. An analysis of this sample showed that the water was quite hard and contained much iron; also that the total number of bacteria was unexpectedly high; although no intestinal bacteria were present. Believing that the high number of bacteria might be due to accidental pollution, another inspection was made on September 15th, 1910, and two more samples collected, one from the pumping station, and one from a hydrant some distance away. The analyses of these samples, which corresponded very closely, indicated a water of excellent sanitary quality and one very low in bacteria. On the other hand, it was very hard, the total hardness being 560 parts; and contained an objectional amount of iron.

On October 7th, 1910, a report was compiled by the engineering department covering the development since the last action of the Board, but in view of the fact that the works were already built, it was thought best to permit operation in order to afford an opportunity for studying the question of the necessity of an iron removal plant.

Accordingly, on May 4th, and July 5th, 1911, one of the assistant engineers inspected the works and collected a total of twelve samples of water. Analyses of these samples showed that there had been no decrease in the iron content since the water of the test well was first analyzed; therefore, complaints were being made by the consumers, and frequent flushings of the mains were found to be necessary in order to remove the iron deposits. The samples collected from the distribution system were generally higher in bacteria than those formerly collected from the well. This suggests the possibility of organic growths in the mains caused by the iron deposits.

ACTION OF THE BOARD.

At a meeting held August 10th, 1911, the State Board of Health considered the question of approving the Minster water works, and approval was withheld until the following conditions had been complied with:

1st. That an iron removal plant of a design satisfactory to the State Board of Health be installed and placed in operation;

2nd. That all privies and cesspools within 500 feet of the well be made watertight; and,

3rd. That detailed plans showing the pumping station and arrangement of the system as completed be filed in the office of the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR NEW LONDON.

On June 5th, 1911, there was received from George S. Powley, member of council of New London, a request for approval of a public water supply in accordance with plans prepared by The Riggs and Sherman Company, consulting engineers, and approved by the Board in 1904. On June 13th, 1911, one of the engineering assistants visited New London and made the necessary inspection. Based on the report of this inspection and also the plans on file, the following report was submitted by the engineering department:

New London is located in the southeastern portion of Huron County near the headwaters of the Vermilion River. The present population is somewhat over 1,500, and shows an increase of 33 per cent. during the past ten years. The chief industry of the village is the manufacture of tile and brick. Its municipal improvements comprise only about 1½ miles of paved streets, two storm sewers, and a municipal lighting plant.

The geological formation at New London comprises drift, underlain by Cuyahoga shale, and Berea grit. This formation is not favorable for obtaining ground water in quantities sufficient for a public supply. After a careful search during the past, therefore, for a satisfactory well, it was decided by the local authorities that the only way to obtain a sufficient quantity of water would be through the use of some surface stream.

In 1904, The Riggs and Sherman Company, Toledo, were retained to prepare plans for building a dam across Bonnie Creek valley, at a point about ½ mile southeast of the village, and thereby form an impounding reservoir having a capacity of some 60,000,000 gallons. The watershed above the proposed dam was reported to be 2,100 acres; but the present Government map shows it to be only 1,248 acres. As-

suming an annual runoff of 10 per cent. or $3\frac{1}{2}$ inches per year (very conservative for average figures), this acreage would yield a total of 120,000,000 gallons per year. The reservoir would probably be filled during periods of heavy rain, and with the estimated daily water consumption of 300,000 gallons, it would probably be large enough to supply the village for some years to come.

Considering the question of evaporation, it might be mentioned that the area of water surface is about 25 acres, and with this area it is not expected that the maximum daily evaporation would exceed 75,000 gallons, while the average daily evaporation would be much less than this.

Owing to the small intermittent flow of Bonnie Creek, no samples of water have been collected, for the reason that they would not be representative of the kind of water which would be furnished to consumers after the reservoir was built. Nevertheless, in view of the character of the watershed, and the existence of ten or eleven houses thereon, it is believed that the stored water will be unsatisfactory, at least much of the time, on account of the turbidity and possible objectionable tests and odors, and will be further subjected to some sewage contamination.

It should be noted (1904 Annual Report, page 81) that the Board approved the (Riggs and Sherman) plan now proposed, under certain conditions requiring the regular inspection of the watershed, and the enforcement of the rules and regulations of the Board for all public water supplies. However, during the seven years which have elapsed since this action was taken by the State Board of Health, the difficulty, especially in the case of small towns, in enforcing these rules and regulations has been demonstrated. It does not seem wise, therefore, to again approve this project under the same conditions, but to require the installation of a suitable filtration plant.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health considered the plans for securing a water supply for New London by means of an impounding reservoir, as shown on a drawing prepared by The Riggs and Sherman Company, consulting engineers, submitted in 1904 and resubmitted on June 5th, 1911.

These plans were approved upon the following conditions:

1st. That full detailed plans for a filtration plant be submitted to and receive the approval of the State Board of Health before the proposed work is begun;

2nd. That the water impounded in accordance with this project be first filtered in a manner satisfactory to the State Board of Health before being delivered to consumers; and,

3rd. That the plans for dam and reservoir as prepared and approved in 1904 be not changed or amended in any way without first obtaining the approval of the State Board of Health.

The attention of the authorities was called to the fact that it has been the frequent experience that impounding reservoirs on small watersheds have not fulfilled what was expected of them in the way of providing sufficient water, and it would be better, therefore, if a larger watershed could be obtained.

REPORT ON PROPOSED WATER PURIFICATION FOR NILES.

On February 20th, 1911, there were submitted by Messrs. Burgess and Long of Columbus, consulting engineers for Niles, plans for a proposed water purification plant for that city. These plans were referred to the engineering department and were reported on as follows:

The city of Niles is located on the Mahoning River some eight or ten miles above Youngstown and has a population of about 8,400. Since 1891 the city has obtained all or most of its water supply from a system of driven wells and also from a large dug well along the bank of the Mahoning River. This source, however, has during the past few years proved insufficient, and consequently, the raw river water has been used to a greater or less extent. With the use of the raw river water, there has occurred in Niles an abnormal amount of typhoid fever and other intestinal diseases.

Action by the State Board of Health under the Bense Act.

On July 31st, 1909, there was received from the board of health of the city of Niles a petition stating that the public water supply of Niles was polluted and requesting the State Board of Health to proceed under the Bense Act and order the city to secure an additional or new source of water supply. This petition was referred for investigation to a committee consisting of Mr. Hartzell, member of the Board, and Mr. A. E. Kimberly, assistant engineer. The results of the investigation showed that the water supply was a menace to the health of the people of Niles. Acting on the report of the committee, the State Board of Health, with the approval of the Governor and the Attorney General, issued an order to the city of Niles requiring said city "on or before October 13th, 1910, to provide a larger supply of water of satisfactory quality, and to make subsequent arrangements so that the emergency intake cannot be used except under extraordinary conditions and then only with the sanction of the local board of health."

Proposed Plans for Water Purification Plant. The plans now presented provide for a mechanical filtration plant having a nominal capa-

city of three million gallons per twenty-four hours, which is four times the present daily consumption of 600,000 gallons. This will, therefore, allow for considerable growth of the city, and will also permit of day operation only for some time to come.

The plant is to be located on land owned by the city and adjacent to the present pumping station and wells. The present intake into the river and also the present connection between intake and existing dug well (which has hitherto been a source of supply) are to remain in use, and the new low lift pump will take the water from said well and raise it into the coagulating basins.

The coagulating basins are two in number and have a total combined capacity of about one million gallons, representing eight hours sedimentation based on the nominal capacity of the plant. They are subdivided so that a much shorter period can be used if desired. Each basin is 100 feet by 38 feet in plan and 18 feet deep. The basins are so baffled that the total distance traveled by the water in each basin will be 235 feet.

From the coagulating basins, the water passes over a long outlet weir, and thence to the filters. The design is such that the velocity of flow of the coagulated water between the basins and the filters will always be slow so that the flow will not be broken.

There are to be four filters, each $18\frac{1}{2}$ feet wide by 21 feet long. Each filter will be divided into two distinct parts by means of a central wash water gutter of very large capacity. The strainer system is to consist of concrete channels of ample area covered by perforated brass plates secured by brass bolts passing into shoulders formed in the sides of the channels. The arrangement of the system is quite similar to that of the Cincinnati filtration plant, although the channels in the case of the proposed plans discharge at their ends through 2-inch openings into a 16-inch pipe located beneath the central gutters of the filters, while at Cincinnati these channels discharge vertically downward through the floor of the filter. The design is such that no piping is necessary beneath the filters.

No brass wire cloth will be used to hold down the gravel, but in order to secure satisfactory operation under a high head of wash, it is proposed to use 18 inches of gravel graded from $2\frac{1}{2}$ to 1-12 inch in diameter. On top of the gravel will be 30 inches of filter sand having an effective size of 0.35 and a uniformity coefficient not greater than 2.

There are six wash water gutters to each filter, each gutter being 10 inches wide by 19 inches deep and $7\frac{1}{2}$ feet long. The wash water, therefore, need travel but a short distance before reaching the main outlet channel.

It is proposed to provide rate controllers and recording loss of head gages for each filter. The effluent, wash water, and drain pipes

for each filter are to be controlled by hydraulically operated valves. In addition, there will be a rewash valve controlled by hand. The usual operating tables are to be used.

As will be seen from the above, it is proposed to clean the filters with water only, and in order to secure sufficient wash water, it is proposed to install a special pump of six million gallons capacity, corresponding to an upward flow through the filters of twenty-four inches per minute.

Storage for the clear water is to be provided in two different basins, one basin being directly under the filters and the other being entirely outside. The first will be 74 feet by 26 feet in plan and 10 feet deep, and will have a capacity of 140,000 gallons. The other basin is to be a circular one, 70 feet in diameter and 12 feet deep, with a capacity of about 360,000 gallons, and is to be covered.

Adjacent to the filters and rectangular clear well is to be a room, 74 feet by 26 feet, the floor of which is approximately on the same level with the bottom of the clear well, and this room is to contain the pumping machinery and coagulant devices. Referring to the latter, it is proposed to store and mix the coagulant at this low level and pump the same into small orifice tanks located in the roof trusses above the filters, the overflow from these tanks of course passing back into the storage tanks. This method means considerably cheaper construction, and the cost of pumping the coagulant will not be great. Tanks for dissolving hypochlorite of lime for disinfection purposes, are to be located at a higher level.

The entire construction of the filters and clear water basins is to be of reinforced concrete of what might be termed the minimum allowable section, but containing a great deal of reinforcement. It is thought that in this way a more watertight work can be obtained.

No plans are shown for the superstructure, although it is understood that this will be a brick building with steel roof trusses. Neither are there submitted detailed plans of the coagulant devices, rate controllers, and certain piping. The plans are in sufficient detail, however, to enable a fairly definite opinion to be formed of the proposed work.

ACTION OF THE BOARD.

On March 24th, 1911, the State Board of Health approved the plans for a water purification plant for Niles, as shown on drawings submitted by Messrs. Burgess and Long, consulting engineers, February 20th, 1911, upon the conditions:

1st. That detailed plans of the superstructure, coagulant devices, rate controllers, and such other details as are necessary before the contract is let, be submitted to and receive the approval of the State Board of Health before construction is begun: (Received April 8th, 1911.)

2nd. That specifications for the work, which are now being prepared for the purpose of letting the contract, be submitted to and receive the approval of the State Board of Health before the contract is let; and (Specifications and additional plans submitted March 16th, 1911.)

3rd. That this approval be void unless construction is begun before July 1st, 1912.

REPORT ON PROPOSED WATER SUPPLY FOR OAK HARBOR.

At a meeting of the State Board of Health on July 19th, 1911, application was made by Mr. I. H. Ellsworth, president of the board of trustees of public affairs of Oak Harbor, for approval of a proposed water supply site to be located in a large lot bounded by Walnut Street, Park Street, Church Street, and the Wheeling and Lake Erie Railroad. The Board at that time voted to withhold approval of the site and to request the local officials to endeavor to secure without undue additional expense a site more remote from habitation.

On August 3rd, 1911, a representative of the engineering department visited Oak Harbor and inspected other possible sites, but reported that the use of any other site would mean an additional expenditure of \$4,000 or \$5,000. Based on this information, and also upon the opinion that the site proposed would be safe from a sanitary standpoint, the chief engineer compiled a report recommending approval of said site, which was presented to the Board at its meeting on August 10th.

At this meeting a large delegation of citizens from Oak Harbor, including the Honorable Charles H. Graves, Secretary of State, appeared before the Board and urged approval of their plan. The matter was again referred to the chief engineer with instructions to visit Oak Harbor, and on August 11th he made an inspection of the topography of the village and conferred with the various local officials interested in the matter and made the following report:

During the inspection of conditions at Oak Harbor it was especially noted that the village is sparsely populated; and that while the map which was presented to the State Board of Health shows it to be covered by streets and house lots, yet in reality the incorporated territory consists largely of uninhabited farm land. As the total area of the village is 450 acres and the population 1,559, the number of persons per acre is only about three.

While the public lot or park, which it is proposed to use for water works purposes is near the center of the corporation from a geographical standpoint, yet it is well removed from the center of population.

The dimensions of the lot are 600.5 by 346.5 feet, and if the widths of the surrounding streets and railroad right of way are added, these dimensions will be increased to 720 by 446 feet. These areas correspond to 5 acres and 7.5 acres, respectively. The wells are to be placed in the extreme westerly end of the lot and will be over 400 feet from the school house now being constructed in the easterly end; which school house, however, will be suitably connected to the sewers.

The site chosen for the wells is higher than any of the surrounding territory except the railroad embankment immediately adjacent. No objectionable surface drainage could, therefore, flow over the surface of the ground near the wells. Within 500 feet of the site there are not more than six dwellings and council has already passed an ordinance requiring cesspools and privy vaults within this zone to be watertight.

Referring to the geological formation, there is said to be some 40 feet of clay overlying the limestone. The writer had an opportunity to inspect the quality of this clay and gain some idea of its extent by means of an excavation which is being made for a new building block.

From the available information, it appears that the dip of the underlying limestone is from the west toward the east; and study was, therefore, made of possible sources of pollution within the corporation limits in a westerly direction from the proposed well site. It was found that there were not more than six or seven houses in a westerly direction within one-half mile or more of the site.

Following the instructions of the Board, a careful study was made as to the feasibility of placing the wells at a point more remote from the center of the village without unduly increasing the expense of the waterworks. Owing to the dip of the rock it seemed logical to consider only those sites located near the extreme westerly edge of the village. The available land, therefore, was confined to a territory in the north-westerly end of the corporation near the north of Washington Street and west of the Wheeling and Lake Erie Railroad.

Any change of the well site to a more northerly or westerly location resulted in moving away from the business district to which it was considered necessary to lay an 8-inch water line. If the site near the corner of Washington and Toussaint streets were used, as was suggested during the inspection, it would necessitate the addition to the system of some 1,500 feet of 8-inch pipe; and also, either 1,500 feet of electric transmission wire or 800 feet of railroad siding. It was not found to be feasible to utilize any of the proposed distribution system in this part of the village as a force main, for the reason that the nearest distribution line, which was 4 inches in diameter, terminated some 700 feet or 800 feet away.

Referring to the cost of purchasing land at or near the corner of Washington and Toussaint streets, it was stated that the owner of

the land had refused to give water rights to the village, and had also refused to sell less than ten acres, and this at a price of \$300 an acre.

Referring to the financial status of the village, it was learned that bids had already been received and opened for constructing the distribution system and installing pumps and machinery in accordance with the plans as presented to the Board, and that the lowest bid was \$26,972. Adding to this the cost of the wells themselves, estimated at \$1,500; and the cost of engineering, estimated at \$1,500 or more; the probable cost of the works would be about \$30,000. In this connection it was learned that the bond issue for which the people voted was only \$25,000, and that it was proposed to raise the additional \$5,000 in some other way. The president of the board of trustees of public affairs, therefore states that his board, from the local standpoint, cannot spend any more money; and at the same time they do not feel justified in putting in a smaller distribution system than was promised to the voters.

CONCLUSIONS.

After carefully studying all of the conditions relating to the proposed water supply for Oak Harbor, first through the reports of one of the assistant engineers, and second from personal investigation, it is believed that wells located as proposed will not be contaminated by drainage from the village, if cased through the clay well into the rock; and also that it is not feasible to move the site to any suitable location more remote from habitation than the one proposed for less than an expenditure of \$4,000 to \$5,000.

On August 19th, 1911, the board of trustees of public affairs of Oak Harbor were notified by the Secretary that the local project had been approved by the engineering committee and that formal action confirming this approval would be taken up by the Board at the next meeting, on September 14th. At this meeting, however, the Board failed to take any action relative to Oak Harbor.

At a meeting of the State Board of Health, held October 18th, 1911, the following report by the chief engineer was considered:

After the September meeting the local officials, who understood that the site had been or was to be approved, proceeded to complete the water works.

Following the notification that the site would be approved, two wells were sunk. These wells are 8-inches in diameter and located about 300 feet apart. Well No. 1 is 241 feet deep and is cased for a depth of 50 feet, the lower 13 feet of the casing being in the rock. Well No. 2 is 149 feet deep and is cased in a similar manner. The

formations encountered in both the wells are practically the same, except that well No. 1 passes through a somewhat thicker stratum of sandstone. The following is a detailed record of the formations in the two wells:

Well No. 1.		Well No. 2.	
Top soil	2 feet	Top soil	2 feet
Yellow clay.....	22 "	Yellow clay.....	8 "
Blue limestone	18 "	Blue clay	12 "
Conglomerate sandstone	12 "	Crust brown stone.....	
Gray magn. limestone.....	18 "	Blue limestone	1 "
Conglomerate limestone	10 "	Gray limestone	6 "
Birdseye limestone	6 "	Congl. cal. sandstone.....	2 "
Calcium sulphate.....	12 "	" sil. rock	3 "
Gray limestone	12 "	Feldspar	3 "
White sandstone	5 "	Red sandstone	11 "
Argillic sandstone	8 "	Sandstone	5 "
Gray limestone	10 "	Argillic	10 "
Red sandstone	8 "	White calcif. sandstone.....	33 "
Argillic limestone	29 "	Calcium sulphate	22 "
Ferruginous sandstone	24 "	Ferruginous sandstone	9 "
Brown calcif. sandstone.....	16 "	Calcif. sandstone	5 "
Gray scrubstone	4 "	Calcif. argillite	9 "
Red sandstone	24 "	Red sandstone	10 "
Calcium shale.....	1 ft. 8 in.		

Most of the water is derived from the limestone rock at a depth of 125 feet. In addition, a considerable amount of water was encountered at a depth of 45 feet. When not pumping, the water stood in well No. 1 at an elevation of 12 feet below the surface, but by pumping, the water was soon lowered to 20 feet, where it remained. During the 48-hour continuous pumping test, each well yielded about 150 gallons per minute without showing signs of exhaustion. This quantity will be ample for the village needs for some time in the future.

Two sets of analyses were made of samples collected by a representative of the engineering department on September 18th and October 2nd. These analyses correspond very closely and the results indicate that the supply is of excellent quality from a sanitary standpoint, although it is hard and contains objectional quantities of iron. From available information, however, it is doubtful whether well water of an improved mineral character could be obtained in this vicinity. Means for reducing the iron could be installed for comparatively little expense.

The plans for the development of the supply provide for pumping each well with a deep well pump, driven by a 5-kilowatt, direct current motor. Each well will be covered with a small brick pump house containing this machinery. The force mains will discharge into a covered concrete reservoir of 225,000 gallons capacity, located between the wells; and the water from this reservoir will be raised by a high pressure centri-

fugal pump, electrically driven, into a 50,000-gallon steel or cypress tank 100 feet high. A pressure of about 40 pounds will thus be available in the distribution system. The present contract calls for laying 27,590 feet of cast iron pipe, ranging in size from 4 inches to 10 inches. There will be 36 hydrants and 26 valves on the system.

ACTION OF THE BOARD.

At a meeting held October 18th, 1911, the State Board of Health approved the proposed water works site for Oak Harbor, which site is bounded by Walnut Street, Park Street, Church Street, and the Wheeling and Lake Erie Railroad, as shown on plans submitted by the board of trustees of public affairs on August 4th, 1911; and also approved of the use of the two wells which have been recently sunk on said site, provided;

1st. That no additional wells be installed without first obtaining the approval of the State Board of Health; and,

2nd. That an iron removal plant of a design satisfactory to the State Board of Health be included in the new waterworks, and that same be used to remove the objectional excess of iron which is present in the water.

REPORT ON ADDITIONAL WATER SUPPLY FOR OXFORD.

On March 23, 1911, a letter was received from Mr. S. H. Allen, clerk of the board of trustees of public affairs of Oxford, stating that five additional public supply wells had been completed and that analyses of the water from these wells were desired. As a result of the above communication, one of the engineering assistants visited Oxford April 12, 1911, for the purpose of collecting samples of the water and making the necessary inspection. The following report was submitted:

The village of Oxford is located in the northwest part of Butler County, one mile west of Four Mile Creek. The village is an educational center, being the seat of Miami University, Oxford College, and Western College for Women. The combined population of the three colleges is approximately 1,500.

According to the 1910 census, Oxford has a population of 2,017, showing an increase of 8 in the past ten years. The topography of the village and surrounding country is hilly. The valley of Four Mile Creek is approximately 140 feet below the highest point in the village. The geological formations in the creek valley comprise drift of coarse gravel about 30 feet in thickness, underlaid by clay of unknown thickness. The bed rock consists of limestone which according to Vol 3, State Geological Survey, has a thickness of approximately 600 feet and includes the Cincinnati group which is underlaid by the Lebanon beds.

The village has the following public improvements which are municipally owned and operated: an electric lighting system, a complete system of sanitary sewers and sewage purification plant, and a water supply.

The present water works system comprises eight drilled wells located in the valley of Four Mile Creek; a pumping station; and a distribution system, consisting of approximately eight miles of mains. The water is pumped direct to the distribution system by two Smith-Vale pumps of 750,000 gallons nominal capacity each. The pumps operate under an average suction lift of 7 feet and an average discharge pressure at the pumping station of 150 pounds per square inch. The average daily consumption is 250,000 gallons.

The public water supply was installed by the village in 1896 at an average cost of about \$45,000. The original source of supply was a large well dug in the sand and gravel beds near Four Mile Creek, about one mile northeast of the village. This well, which is at present used as an emergency source of supply, is 20 feet in diameter and 35 feet deep, is lined with brick laid in cement, and is covered by means of a brick arch. The original water supply was introduced without consulting the State Board of Health. On being notified that the Board's approval was required by law, an application was duly made, and a committee of the Board visited Oxford August 15, 1896. On September 11, 1896, a letter was sent to the board of water works trustees stating that the supply had been approved.

Owing to the increased consumption, the yield of the original well soon become inadequate, and three drilled wells were put down in the gravel deposits from 100 to 300 feet northeast of the pumping station. There is no record of these wells ever having been approved by the State Board of Health. In view of the continued insufficiency of the supply, five more wells were drilled in the gravel deposits 500 feet northeast of the pumping station. These wells were put down in January, 1911, and used as an additional source of supply without the approval of the State Board of Health.

The five new wells are located from 350 to 500 feet northeast of the pumping station, and about 800 feet east of Four Mile Creek. Four of the wells are located on the corners of a 100-foot square, and the fifth, 50 feet northeast of the group. The new wells are tributary to a 10-inch suction line which connects with the suction from the three originally drilled wells 25 feet from the pumping station. By means of a valve in the suction line, either group of wells can be used independently. The proposed wells are 8 inches in diameter and drilled to a depth of approximately 31 feet, penetrating the following formations: Loam, 5 to 8 feet; coarse clean gravel, 14 to 18 feet; blue clay, 4 to 10 feet. No log of the drilling was kept, so the exact thickness of the for-

mation penetrated is not known. No test was made to determine the yield of the wells after drilling had been completed.

The topography in the vicinity of the wells is rolling to hilly. A few thousand feet northeast the hills rise to a height of approximately 100 feet above the wells. The surface drainage is from the northeast. A depression in the surface of the ground near well No. 5 causes the formation of a pool of water or shallow swale approximately 300 square feet in area. At the time of inspection it was suggested to the local authorities that this be filled in. The only habitation within 500 feet of the wells is a house 200 feet northeast of the center of the group of proposed wells and about 175 feet from well No. 9. It was observed at the time of the visit that this trenching had been completed for the purpose of draining a privy located at this house. This drain as proposed would discharge on to the surface of the ground not more than 100 feet from the nearest well, and owing to the slope of the surface of the ground, the drainage from the vault would be carried directly over the well. The land on which the above house and wells are located is owned by Mr. L. N. Bonham.

Quality of Water. At the time of the visit, three samples of water were collected for analysis. Two of these samples were collected from the distribution system, and one from a faucet on the discharge end of the pump. At the time the samples were collected, water was being pumped from the five additional supply wells. As indicated by the analytical results, the water is of satisfactory quality from a sanitary standpoint. It was stated by Mr. Allen, clerk of the water works department, that some complaint had been made owing to the high turbidity in the water. This turbidity usually appears when the wells are being pumped at a high rate and is due to iron. The highest iron content shown by the accompanying analyses is one part per million. As yet, the iron has caused no general complaint. It should be noted that at the time the samples were collected the pump was being operated at a very modern rate, and this may partly explain the fairly low iron contents shown by the analyses. It seems advisable that the group of proposed additional wells be subjected to a continued test for yield, or, if this is not feasible, a single well should be tested, during which time samples should be collected for analysis. According to the analyses, the physical properties of the water at the time the samples were collected were good. The organic content of the water is low. However, the total hardness, which averages 314 parts per million, is rather high. The total number of bacteria is 750 per cubic centimeter for the sample collected at the pump, while the sample collected at the dead end on the distribution system shows 85 per cubic centimeter. No bacteria of intestinal origin are present in ten cubic centimeter portions.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health considered the question of an additional water supply for the village of Oxford, and decided to withhold approval until the drainage from the residence of Mr. L. N. Bonham was rearranged so as to avoid any possibility of contaminating the wells; and until the shallow swale near well No. 5 was suitably filled in.

The authorities were requested to notify the Board when these improvements had been made, so that another inspection could be made and the matter presented to the State Board of Health for definite action.

In June the village clerk wrote that Mr. Bonham refused to remove the drainage from his vault, which was considered a menace to the water supply well, and the matter was referred to the Attorney General, who held that the board of trustees of public affairs or the board of health of Oxford had authority, under Section 4420 of the General Code, to cause this drainage to be removed, or corrected.

EXAMINATION OF WATER FROM OXFORD.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
.....	1896 Aug. 15 1900	0	none	none		1.28	.062	.038	.002	1.33
1364	Sep. 18	trace	"	"		1.15	.086	.004	none	trace
1436	Oct. 16 1911	"	slight	trace	none	0.86	.057	.010	.005	2.32
10254	Apr. 12	12	1	none	none	0.15	.036	.020	.001	0.4
10255	Apr. 12	none	2	"	none	0.15	.048	.008	0	0.6
10256	Apr. 12	none	3	"	none	0.15	.028	.012	0	0.4

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
†	4.27	.....	*	.....	405	.....	.....	.....	.....
1364	3.3	276.6	none	.....	360	87	.....	21	Negative.
1436	37.7	.....	.....	.....	598	.....	.....	1950	Positive.
10254	5	278	35	.....	362	58	0.8	750	Not in 10 cc.
10255	5	274	35	.....	365	57	0.3	105	Not in 10 cc.
10256	5	272	50	.....	370	55	1.0	85	Not in 10 cc.

Source of Samples.

1364. Public supply well in valley of Four Mile Creek. Sample collected at the time of an outbreak of typhoid fever, from faucet on distribution system.

1434. Well at University grounds. Collected at time of an outbreak of typhoid fever.

10254. Five drilled wells located in the valley of Four Mile Creek. Proposed as an additional source of supply. Sample collected from faucet on pump discharge by M. Z. Bair.

10255. Five drilled wells located in the valley of Four Mile Creek. Sample collected from faucet on distribution system at Miami Laundry by M. Z. Bair. Proposed as an additional source of supply.

10256. Five drilled wells located in the valley of Four Mile Creek. Proposed as an additional source of supply. Sample collected from faucet at dead end on distribution system by M. Z. Bair.

REPORT ON PROPOSED PUBLIC WATER SUPPLY FOR PAYNE.

On August 25th, 1911, a request was received from Mr. Charles Brossman, of Indianapolis, consulting engineer for the village of Payne, for approval of a site which had been selected for public water supply wells. On August 29th, 1911, an inspection was made of the village and site by a representative of the engineering department and the following report submitted:

The village of Payne is located in the west-central portion of Paulding County. The population according to the last census is 1,027, and shows a decrease during the previous ten years. The area of the corporation is 0.8 square mile. The village is located on a tributary of

*Temporary hardness, 321.

Permanent hardness, 26.

† A large dug well in the valley of Four Mile Creek. Sample collected by Dr. C. O. Probst.

Flat Rock Creek, which ultimately discharges into the Auglaize River. The topography in the vicinity of Payne is very flat.

The village has no sanitary sewers, but there is an egg-shaped storm drain, 2 feet by 3 feet, with vitrified pipe laterals. This sewer was constructed in 1901 and, it is claimed, is not used for domestic sewage, although several downspouts, cistern overflows and wastes from one canning factory are discharged into it. No nuisance could be traced to the existence of this sewer during the recent inspection.

At the present time the residents of the village obtain their water supply entirely from private wells, but owing to the increasing desire for modern plumbing and also the importance of fire protection, the village has recently issued bonds for \$17,000 for water works purposes.

In regard to the geological formation in the village, it may be said that the drift has a depth of 45 feet, and is of decidedly clayey formation. Underlying the drift are the Devonian and Helderberg limestone, and it is said that many excellent wells have been obtained in the vicinity by drilling into the rock.

During the inspection a sample was collected from an existing well which is within the limits of the site proposed to be used for water works purposes. This well is 285 feet deep and is cased through the drift, a distance of some 45 feet.

The quality of water from this well as shown by analysis is excellent from a sanitary standpoint, although it is turbid, high in alkalinity and somewhat high in iron. The well had been pumped two hours previous to the collection of the sample.

At the time the water works bonds were authorized, it was voted to issue other bonds for the purchase of the existing light plant, which is located on a tract of land covering 2.4 acres in the center of the village. The purchase of this plant was made with the intention of constructing and operating the water works, including the wells, on the same site.

The site which has thus been selected is close to the built up portion of the village. There are sixteen houses, together with the accompanying barns, sheds, pig pens, chicken yards and privies, within 500 feet, some of which are within 100 feet of the site. Besides the above, there are two elevators, a canning factory, and coal sheds within 250 feet.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health disapproved the site proposed for public water supply wells, adjacent to the existing electric light plant in the village of Payne.

The Board advised that the plans be changed and the supply wells located outside the built up portion of the village, which would not

necessarily mean the separation of the pumping station and electric light plant if the wells are pumped by electrically driven pumps fed with current generated at the village plant.

REPORT ON CERTAIN DETAILS OF THE PROPOSED WATER PURIFICATION PLANT FOR PORT CLINTON.

On December 8, 1910, detailed plans of certain portions of the proposed water purification plant for Port Clinton were submitted by Mr. F. B. Leopold, general manager of the Pittsburg Filter Manufacturing Company. There plans were referred to the engineering department which reported on them as follows:

On September 21, 1910, the State Board of Health approved plans for a mechanical filter plant for the village of Port Clinton, prepared by Mr. William G. Clark of Toledo, consulting engineer. The first two conditions of approval were:

"1st. That plans showing all details of piping and strainer system, controllers, and coagulant devices, as these are to be actually installed, be submitted to and receive the approval of the State Board of Health before the contract for the work is awarded;

"2nd. That in case the contractor's plans for the filter equipment are adopted by the local authorities, in accordance with Article 5 of the specifications, the contractor's guarantee shall be submitted to and receive the approval of the State Board of Health before the contract is awarded."

Since the approval was given, the contract has been awarded to the Pittsburg Filter Manufacturing Company which is to furnish detailed designs for certain parts of the piping and strainer systems, controllers, and coagulant devices. In accordance with condition No. 1 of the approval, plans showing these details are now submitted to the Board for approval by the Pittsburg Filter Manufacturing Company.

The plans include details of the overflow troughs, loss of head gages, controllers, and chemical feed tank. In addition, the dimensions of the filter units are to be changed from 10 feet by 20 feet to 17.5 feet by 10.3 feet, in order to fit more compactly into the filter building. The filtering area is to remain the same as in the plans formerly approved.

Another slight departure from the original plans is that there will be installed at the outlet end of each filter an overflow weir forming a channel 18 inches wide and 5 feet deep, into which the wash will discharge on its way to the main sewer. This change is made with the idea of effecting a more prompt discharge of the wash water.

The detailed plans presented by the filter company have been prepared in accordance with good practice, and there appears to be nothing in them which can be criticized. It should be noted, however, that the second condition of approval, relating to the guarantee to be furnished by the contractor, has not been fulfilled.

ACTION OF THE BOARD.

At a meeting held January 25th, 1911, the State Board of Health considered the detailed plans for wash water troughs, controllers, loss of head gages, and chemical feed suction tank, as well as plans for certain modifications in the general design of the filter units as originally approved, submitted on December 8th, 1910, by The Pittsburg Filter Manufacturing Company, contractors.

These plans were approved, as called for in the first condition of approval of the original plans.

The attention of the authorities was called to the second condition of the approval of the original plans, requiring the contractors to submit for approval of the State Board of Health a copy of the guarantee which is called for in the engineer's specifications under which the plant is being built.

REPORT ON PROPOSED INFILTRATION SYSTEM FOR PORTSMOUTH.

On June 7th, 1911, there was received from Mr. John Jones, director of public service, Portsmouth, a general plan, prepared by Mr. Samuel M. Gray, consulting engineer, of an infiltration system for obtaining a new public water supply for the city. The plan was also accompanied by a brief description of same, prepared by Mr. Gray; and a few days later, on June 10th, there was received from Burgess and Long, engineers, a report on tests made of the quality of the proposed supply. The plan and other information were referred to the engineering department and the following report submitted:

The question of an improved water supply for Portsmouth has been agitated from time to time for many years. The present movement for an improved water supply may be considered to be about six years old, the question having been brought before the Board in 1905. Progress from 1905 to 1909 is discussed on pages 138 to 148 of the Annual Report of the Board of 1909. The present report will deal therefore, only with the development from 1909 to date.

Following the approval of the State Board of Health of the plans completed by Mr. Gray in 1909, an attempt was made by city council to issue bonds, without a vote of the people, for construction work.

The issue was declared illegal in the courts and the matter was then presented to a vote of the citizens in November, 1910, and the proposition was carried. Bonds for \$300,000 were then issued and Mr. Gray was again retained as consulting engineer for the city.

Following the action of the State Board of Health in 1908 and 1909 (see Annual Report for 1909), more data became available with reference to the general undesirability of infiltration systems, as well as the unreliability of incomplete preliminary tests, owing to the variable character of the material in sand bars. When the question of progressing further with the Portsmouth water supply was again brought to the attention of the Board, therefore, the city officials were advised to make a very complete test before beginning construction of their permanent plant.

When Mr. Gray was again retained, some six months ago, he arranged with Burgess and Long, engineers, of Columbus, to superintend an extensive test of the Tygart bar, for the purpose of determining the general character of the water which could be derived therefrom.

On April 3rd, an inspection was made of the method of conducting the test by a representative of the engineering department. The testing of the bar was accomplished from the deck of a ferry boat, which was securely anchored in position at the desired location. The test wells consisted of 2-inch, threaded, wrought iron pipe, cut into suitable lengths for driving. To one end of each length was fastened a well point, consisting of a 2½-inch Cook strainer, 20 inches long. These test wells were driven at thirty-six different points in Tygart bar. Seventy-five per cent. of the test wells penetrated to a depth of 4 feet below the bar, and the remainder to a depth of 6 feet. Each test well was pumped by hand for thirty minutes or more, and samples collected.

On tabulating the results of the analyses, it was found that the water at a depth of 6 feet contained in all instances objectionably large quantities of iron. The iron content of the samples at 4-foot depths ranged from 0.2 to 2.0 parts per million, and in most cases was sufficient to cause precipitation of the iron. The evidence obtained showed that the water from the test wells, being considerably harder than the river water, was derived from ground sources beneath the river and was not filtered river water.

The engineers, Burgess and Long, sent their report to the consulting engineer. The rather unsatisfactory quality of the water from the test wells was not, however, considered by him as affording sufficient grounds for abandoning the infiltration system. Accordingly, Mr. Gray prepared a general plan showing the method of laying the infiltration pipes and suction mains in the Tygart bar and submitted same to the director of public service, with the recommendation that it be submitted to the State Board of Health for approval. Accompanying the suggested plan was the following statement submitted by Mr. Gray:

"After due and careful study I recommend that you adopt a system of sand filtration similar to that which we are building at Parkersburg, West Virginia; which consists of driving sheet piling in the bar; excavating the material to a proper depth; putting in 12 inches of washed screened gravel below the strainer pipe, varying in size from one inch to two inches, extending this layer of gravel six inches above the strainers. The strainers are to be the Cook brass strainer pipe $4\frac{1}{2}$ inches in diameter. A layer of washed sand of proper size will be placed on top of the gravel to a depth of four feet above the top of the screened gravel, making a total depth of four and one-half feet from the top of the pipe to the surface of the sand on the bar.

"I enclose a general sketch, showing the principle of thus laying the pipe, and building the works. It would be my intention to divide the filtration system into six sections, each section to be connected with the shore by an independent 20-inch suction pipe, which would be connected with a standpipe by a series of valves in the gate-chamber; the standpipe to have sufficient capacity and height so that one of the six sections of the strainer pipe or filter bed can be thoroughly flushed at one time washing off any deposit which might collect in or on the surface of the filter. Of course connected with this work will be the pumping station, reservoir, etc."

Summing up the available evidence with reference to infiltration systems in general and the Portsmouth system in particular, there does not seem that there is sufficient basis to guarantee the securing of enough water of satisfactory quality continuously in the future. The analytical evidence obtained from the recent tests shows that ground water would be obtained at least during a considerable portion of the time, and that this ground water on account of its iron and hardness would not be satisfactory; and furthermore, that the precipitation of the iron in the strainers might cause a serious clogging of the system and result in the necessity for using raw river water. Of course, some relief would be secured by back flushing. However, the difficulty of evenly distributing the pressure and the doubt as to the general effectiveness of back flushing prevent great reliance being placed upon this feature. Then again, the permanency of the bar is debatable; and it is not beyond possibility that some of the material over the strainers would be washed away or at least seriously reduced in depth.

As mentioned above, the experience with which the Board is familiar during the last two or three years does not indicate that infiltration systems are in general reliable. In spite of the fact that the Board some three years ago approved an infiltration system for Portsmouth on the strength of evidence then available, it is believed that, based on more recent information, and in view of the fact that the Portsmouth officials have again submitted the question to the Board, approval should not be granted.

At a meeting of the State Board of Health held July 19th, 1911, this matter was referred to a committee consisting of Dr. Frank Warner, vice president; Mr. John W. Hill, member; and Mr. R. W. Pratt, chief engineer.

This committee visited Portsmouth on July 28th, 1911, and made the following report:

A careful inspection was made of Tygart Bar, located on the Kentucky side of the river opposite the upper portion of Portsmouth, from which it is proposed to secure a new water supply by means of a system of natural infiltration, constructed in accordance with plans prepared by Mr. Samuel M. Gray, consulting engineer for the city. In making this inspection the committee was generously assisted by the mayor, the director of public service, the water commission, representatives of the local board of health, as well as by other officials and citizens.

After viewing the bar, examining the plans, and considering all the information relative to the problem, the committee fails to find sufficient evidence to insure, or even make probable, the success of the proposed system. It is, therefore, unanimously recommended that the proposed plan be disapproved.

The recommendation for disapproval of the proposed natural infiltration system is based principally upon the following considerations:

1st. That the surface of Tygart Bar will at certain times, and especially after the Government dam below Portsmouth is completed, become more or less clogged and will prevent the uniform passage of the river water downward into the collecting system. This will result either in a too rapid rate of filtration, and consequent lack of purification, on certain parts of the bar, or it will result in a failure to secure enough water for the needs of the city.

2nd. That the collecting system will be fed to a greater or less extent by ground water which has been shown by tests to be objectionable from the standpoint of iron content and hardness; and clogging of the strainers may result therefrom.

3rd. That it is entirely possible that the thickness of the filtering material above the collecting system may be seriously decreased by the action of the river currents.

4th. That it is believed that the proposed method of back flushing the system by a reverse current, in a manner employed in mechanical filters, would not be efficient unless the rate of application of the "wash" water be approximately equal to that necessary in mechanical filter plants; and it is clearly impracticable to provide for such a rate with the proposed system.

5th. That the inaccessibility of an installation, such as that proposed, would be distinctly undesirable when its use was necessary to make repairs or changes.

6th. That in case of failure of the proposed installation, the people of Portsmouth would be obliged to use the impure river water. This would be especially dangerous after the people had become accustomed to the pure water.

The committee is in accord with the advice given by the consulting engineer, Mr. Gray, to the city under date of June 1st, 1911, which is as follows: "If they (the State Board of Health) will not approve of the plan of sand filtration (natural infiltration) in general, then my next recommendation would be for you to build a mechanical filtration plant."

While the committee believes that a mechanical filtration plant would be especially adapted to the conditions at Portsmouth, it is suggested that before designing such a plant, a careful study be made by the consulting engineer relative to the best source of supply and location of intake. From the standpoint of control of the present and future pollution of the supply, the Scioto River being within the boundaries of the state of Ohio, has an advantage over the Ohio River. Approved practice indicates the desirability of securing water which has been subjected to as little pollution as possible before introducing it into the filtration plant. The relative advantages of both rivers should, therefore, be studied from this standpoint.

ACTION OF THE BOARD.

At a meeting of the State Board of Health, held August 10th, 1911, the report of the special committee on the proposed water supply for Portsmouth was considered and the report and recommendations adopted. The Secretary was instructed to notify the authorities that the recommendation of the committee was adopted, namely, "After viewing the bar, examining the plans, and considering the plans, and considering all the information relative to the problem, the committee fails to find sufficient evidence to insure or even make probable, the success of the proposed system. It is therefore unanimously recommended that the proposed plan be disapproved."

REPORT ON INVESTIGATION OF THE WATER PURIFICATION PLANT AT SANDUSKY.

It having come to the attention of the State Board of Health, through the public press, that the Sandusky water purification plant had been partially shut down, a committee consisting of Dr. Hasencamp, member, and the chief engineer, was appointed at the meeting of the Board held May 10th, 1911, to investigate and report on the subject. This committee visited Sandusky on May 17th, 1911, and submitted the following report:

The Sandusky water purification plant, which has been very thoroughly described in past reports of the State Board of Health, has now been in operation about two years. A test by a representative of

the State Board of Health as well as the daily records of the chemist in charge, show that under certain conditions the plant is capable of satisfactorily purifying the water. Nevertheless, it has been necessary, on account of poor original construction, to shut down all or a part of the plant from time to time for repairs; and at these periods the purification of the water has been greatly interefered with, and has resulted in increasing sickness from typhoid and other intestinal diseases.

The recent inspection shows that leaks have developed in the wall between the northerly coagulation basin and the clear well, with the result that unpurified water has been passing directly into the filtered water basin. The northerly coagulation basin has therefor for some weeks been shut down in efforts to repair the leaks. During this time the southerly basin has been called upon to do the work of both basins, with the result that the filters can only with difficulty satisfactorily purify a sufficient quantity of water. With the increased consumption that will occur in the very near future with the advent of excursionists, it is probable that satisfactory purification of the water will not prevail unless the imperfect wall is properly repaired. This should be done at once.

ACTION OF THE BOARD.

At a meeting of the State Board of Health, held June 1st, 1911, the report of this special committee appointed to investigate the water purification plant at Sandusky was presented. The Secretary was instructed to inform the authorities of Sandusky that the Board was of the opinion that, in view of the present as well as former inspections of the construction of the Sandusky filtration plant, the only safe and sure means of providing pure water to the city of Sandusky would be to build a clear water well entirely separate from the present plant, thus making it impossible for unpurified water to leak into it; and in addition, one or two more filter units should be installed in order to insure satisfactory purification of the water even at times of excessive consumption and when one of the existing units is out of service.

The attention of the authorities was also called to the necessity of keeping in charge of the plant a man thoroughly practiced in filter supervision as well as in making of necessary analyses, chemical and bacterial, for determining at all times the degree of purification.

REPORT ON PROPOSED WATER SUPPLY FOR SUGAR CREEK.

On January 7th, 1911, a communication was received from Mr. W. A. Hahn, village clerk, Sugar Creek, stating that the village was contemplating the installation of a public water supply, and soliciting the assistance of the State Board of Health relative to the location of the

public supply wells. On February 16th, 1911, one of the engineering assistants visited Sugar Creek for the purpose of making an examination on the ground relative to the location of the wells. Visits were also made April 5th, April 18th and June 22nd, 1911, for the purpose of collecting samples from the proposed wells and inspecting the proposed developments. On July 10th, 1911, general plans showing location of wells and distribution system were received from L. E. Chapin, consulting engineer. The following report was submitted:

The village of Sugar Creek is located in the western portion of Tuscarawas County on the south fork of Sugar Creek. The population, according to a preliminary report of the 1910 census, is 389. The manufacture of tile and brick constitutes the chief industry of the village. The village of Shanesville, with a population of 334, adjoins Sugar Creek on the west, but no provision will be made for supplying Shanesville with water.

The geological formation of the hill upon which the village is located consists of surface clay and shale to a depth of 70 feet. The formation in the valley consists of surface clay to a depth of 20 feet, underlaid with clean white sandstone of unknown thickness. In the valley all the private water supplies are derived from the clay at rather shallow depths. On the hill a few private wells yield a small amount of water, although the formations in this vicinity are practically devoid of appreciable quantities of water.

Previous to the proposed improvements, Mr. L. E. Chapin, consulting engineer of Canton, was employed to prepare plans and an estimate of cost of the work. It had been decided that the source of supply should be drilled wells in the valley of Sugar Creek, it being thought that the formation in this locality would be abundantly waterbearing. On February 16, 1911, a site was selected for proposed public supply wells by one of the engineering assistants. This site is well located with regard to protection from contamination from surface and underground sources. Subsequent to the selection of the site, a test well was put down to a depth of 40 feet; and upon failing to find sufficient water at this depth the local authorities were advised to drill deeper. After drilling to a depth of 94 feet water was encountered in sufficient quantity to cause the well to flow at a rate of approximately ten gallons per minute. The formations penetrated by well No. 1 are as follows:

Surface clay	10 feet
Quicksand	23 "
Loose shale	7 "
Fine hard sandstone	44 "

The well is 8 inches in diameter and is cased to a depth of 44 feet, the casing passing 2 feet into the sandstone. The water is found in the sandstone at a depth of approximately 90 feet, at which depth the rock

becomes more porous. The well was subjected to two pumping tests of three hours each, and the discharge as measured in a 50-gallon barrel, was 110 gallons per minute. Pumping at this rate reduced the level of the water to 19 feet in ten minutes; while pumping at the rate of 150 gallons per minute the water was lowered below the end of the suction pipe. When pumping ceased the surface of the water rose to the top of the casing within five minutes. At the end of the pumping test samples of the water were collected for analyses.

A second well (Well No. 2) was later located 100 feet northeast of well No. 1. This well is 8 inches in diameter and drilled to a depth of 100 feet, penetrating essentially the same formations as those penetrated by well No. 1. Subsequent to the drilling of this well a short pumping test was conducted, at the end of which samples of water were collected for analyses by Mr. W. A. Hahn, village clerk. The water in this well is found in the sandstone at a depth of approximately 90 feet. The normal water level in the well is 5 feet below the surface of the ground. The well was pumped continuously for twenty hours at an average rate of 65 gallons per minute, or 93,600 gallons per day. Pumping well No. 2 at the above rate reduced the water level 18 feet; and also caused a lowering of the water of 12 feet in well No. 1. When pumping was discontinued both wells regained their normal water level in ten minutes.

Quality of Water. The analytical results of the samples collected from proposed public supply wells Nos. 1 and 2 indicate that the water is of satisfactory quality from a bacterial standpoint, but is open to objection on account of its high iron content, which in the case of well No. 2 is 2.6 parts per million, and for well No. 1, 1.2 parts per million. This iron stains the water and causes a sediment. It is somewhat problematical whether the iron will be reduced, with continued pumping. Aside from the high iron content the water is satisfactory for domestic use.

In conclusion it may be stated that the sanitary features with respect to the location of the proposed public supply wells are satisfactory; and although a greater supply would be available from the wells had they been located farther apart, it is thought that they will furnish sufficient water to meet the demands of the village for a number of years.

The wells will be pumped by means of a 6½ by 8-inch triplex pump, of a capacity of 175 gallons per minute, driven either by a gas engine or an electric motor. The water is to be drawn from the wells by direct suction, and there will be no opportunity for surface contamination.

The pumping station is not yet designed, but will be 14 by 20 feet in plan, with a flow of 4 feet below the surface of the ground in order to provide easier suction lift.

The water will be pumped into an elevated tank 180 feet above the pumping station. This tank is to have a capacity of 40,000 gallons, and will be supported by a four-post steel tower 70 feet high. The main distribution lines are 6 inches in diameter, and the water is to be delivered to all parts of the village.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the plot of ground for water works purposes for the village of Sugar Creek, shown on plan prepared by Mr. L. E. Chapin, consulting engineer, and submitted on July 10th, 1911, provided:

- 1st. That the State Board of Health be notified when any new wells are to be sunk; and,
 - 2nd. That this approval be void unless the wells are placed in use before January 1st, 1913.
-

REPORT ON PROPOSED EXTENSION OF TOLEDO WATER PURIFICATION PLANT.

On February 18th, 1911, there were submitted by Mr. William G. Clark, consulting engineer for Toledo, full plans and specifications for enlarging the present water purification plant of that city, and on February 21st formal request for approval of same was received from Mr. John R. Cowell, director of public service. The plans and specifications were referred to the engineering department and the following report was submitted:

At a meeting of the State Board of Health held October 25th, 1905, detailed plans and specifications for a water purification plant for the city of Toledo, submitted by Mr. Charles L. Parmelee, consulting engineer, were approved, provided:

"That a laboratory be established at the filtration works and that analyses of the raw and filtered water be made daily, and oftener during the high stages of the river when the character of the raw water is likely to change suddenly; and, that in the operation of the plant a degree of efficiency shall be maintained at all times satisfactory to the State Board of Health."

Referring to the above conditions of approval, it may be said that the plant has been under expert direction, and it is reported that excellent results have been obtained. No detailed examination, however, has been made by a representative of the State Board of Health.

The original plans approved by the Board provided for a plant having a nominal capacity of 20,000,000 gallons per day, although certain parts of the plant such as the main piping and coagulating basins were designed to permit of the addition of ten more filter units, thus increasing the capacity to 30,000,000 gallons per day.

The proposed plans provide for enlarging the plant by the addition of fourteen filters, each of one million gallons capacity, thus making the total capacity of the plant, 34,000,000 gallons per day. The filters are to be duplicates of those installed according to the original plans and which, from present available knowledge, have proved satisfactory. There are to be no new features introduced except in the matter of the type of indicator, which is a minor detail.

In view of the fact that the proposed extension contemplates simply duplicating the filter units, plans for which have already been approved by the State Board of Health and which have been found satisfactory, there would seem to be no reason why the plans now submitted should not be approved.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health approved the plans, as shown on drawings and described in specifications, submitted by Mr. Wm. G. Clark, consulting engineer, February 18th, 1911, for enlarging the present water purification plant of the city of Toledo.

REPORT ON PROPOSED WATER SUPPLY FOR UTICA.

Utica was visited by one of the assistant engineers on October 10th and again on October 31st, 1910, for the purpose of collecting samples from proposed water supply wells and of obtaining general information in regard to the proposed public supply. The following report was subsequently submitted:

Utica is located in the north-central part of Licking County and is on the watershed of the Muskingum River. The drainage from Utica and the surrounding country reaches the Muskingum River by way of Licking Creek. The village has a population of about 900. This figure is obtained from an estimate based on the U. S. census of 1890 and 1900, which report the population as 763 and 826, respectively. Utica is situated for the most part on low, level ground which is surrounded by hills. The village presents a generally neat appearance and appears to be in a very prosperous condition. The main street is well paved and the remaining streets are maintained in fair condition. There is at present no sewerage system or water supply available for the inhabitants.

During the summer of 1910 this department was informed by Mr. S. S. Wyer, of Columbus, who had been retained by the village as consulting engineer, that the village was contemplating the installation of a public water supply. The general scheme of development was outlined at this time to the acting chief engineer. Mr. Wyer was informally advised that the general scheme of development was satisfactory, but that before this department could make any report on the proposed new

supply, it would be necessary to have detailed plans submitted showing the entire scheme of development. He was also advised that it would be necessary to conduct a pumping test of the proposed supply wells so that samples could be obtained therefrom for analysis in the laboratory of the State Board of Health and the availability of an adequate supply could be demonstrated. It was understood at this time that the plans and specifications should be submitted to this department, and that the wells should be drilled and tested; and that the wells and plans should receive the approval of the State Board of Health before the contracts for the installation of the public supply should be let.

The plans and specifications for the proposed public water supply for Utica were submitted to the Secretary of the State Board of Health on September 3, 1910, by Mr. S. S. Wyer. At the same time a letter dated August 18, 1910, signed by Mr. F. M. Crow, president of the board of trustees of public affairs of Utica, was also submitted. The letter states that the contract for the water works was let on August 18th, and therefore it should be noted that the placing of the plans and specifications before the State Board of Health was delayed two weeks after the letting of the contract and the writing of the letter of announcement.

The plans and specifications are prepared by Mr. S. S. Wyer and indicate the proposed scheme of development and the manner of constructing the proposed water system for the village. The plans are very general in character and very meagre as regards details. The general features of the water works as shown consist of two drilled wells; two independent sets of pumping equipment, each set contained in a separate building located directly over each well; a storage reservoir; and a distribution system.

The two wells are located on high ground east of the village. There are no houses sufficiently near the proposed site to in any way affect the quality of the water obtainable from the wells. The slope of the land at this location is from east to west, or toward the wells from an entirely uninhabited district. The location in regard to possible sources of contamination may be said to be excellent. The specifications call for two wells at this site, each to be approximately 150 feet deep, 8 inches in diameter, and to be cased solidly into the underlying rock. The wells are placed about 150 feet apart in a line east and west. It would have been better to have placed the wells in a line approximately north and south, in which case the likelihood of interference between the wells would have been minimized.

A small pumping station (9 feet by 12 feet inside dimensions) is located directly over each well. Each station contains a deep well pump and a gas engine. The working barrel of the pump is $7\frac{5}{8}$ inches in diameter and 24 inches long. The normal operating rate for the pump is 25 revolutions per minute. The engine is gear connected to the pump and provided with a clutch to facilitate starting. A 6-inch drop pipe

is used in the well, and the plans provide for a 4-inch discharge pipe from the head of the well to a 6-inch main which passes about 15 feet north of the stations.

The reservoir is situated on the summit of the hill directly east of the village and east of the wells. It is constructed of reinforced concrete, is rectangular in shape, and is provided with a wooden covering. The inside of the reservoir is waterproofed. The over-all dimensions are 76 feet 8 inches by 31 feet 8 inches by 13 feet. The reservoir is divided by a cross wall into two equal parts. Each division has the following inside dimensions: 37 feet 1 inch by 30 feet 0 inch by 12 feet 6 inches. Four columns, two in each division, together with cross and side walls, support the roof. Assuming the flow line to be 6 inches below the top of the reservoir and allowing for the curved corners and columns, the capacity of each division is about 97,000 gallons, or the total storage afforded by the entire reservoir approximately 194,000 gallons. A low wooden roof covers the reservoir. This roof is provided with two small openings, one at either end of the reservoir. The roof fits the reservoir tightly all the way around and effectively prevents all possible contamination of the water of the reservoir; however, its design is defective in that it does not provide for gaining access to the reservoir with sufficient ease to permit of necessary inspection, cleaning, or repairs. Neither overflow nor drain is provided for the reservoir, nor is the floor sloped to assist in the cleaning of the reservoir should it become necessary. No connection is provided between the two parts of the reservoir, except through the distribution system. The inlet and outlet piping and the valves controlling the same are poorly arranged and do not permit of sufficient flexibility in the control of the water in the reservoirs during times of cleaning. The reinforcing in the concrete is illogically designed and does not provide for the maximum economy or strength for the amount of material used.

The distribution system is apparently well proportioned and provides for a good circulation of water. The general absence of long dead ends is the especially commendable feature. The design provides for 82 per cent. of 6-inch mains and 18 per cent. of 4-inch mains in the total length of 4.9 miles.

On October 8, 1910, this department was notified that the first well had been completed and was being pumped, and that the pumping would continue until a sample could be collected by a representative of the engineering department. Accordingly, one of the assistant engineers visited Utica on October 10th to collect a sample of the water. At the time of this visit, general information was obtained from Mr. Rice, the well driller, and from Mr. Jones, the engineer for the contractor. The following section of the well was obtained from Mr. Rice:

<i>Material.</i>	<i>Thickness.</i>	<i>Depth to Bottom of Stratum.</i>
Yellow clay	20 feet	20 feet
Blue clay	65 "	85 "
Sandstone (freestone)	10 "	95 "
Compact and loose shales in alternating strata each about 10 feet thick.....	78 "	173 "

Water was encountered at three levels; first, at 95 feet; second, at 135 feet; and third, at 172 feet. The water level after encountering the first two waterbearing seams was 35 feet below the level of the ground. Upon encountering the third seam the water level dropped to 40 feet below the ground level.

Upon inquiry it was found that the well had not been pumped continuously prior to the visit of the engineer, but had been started only about two hours previously. At the time of the visit the well was pumped at the rate of 100 gallons per minute for one hour. The measurement was made in an oil barrel. The water from the well was very turbid, and therefore the speed of pumping was reduced to 80 gallons per minute for one hour in the hope of reducing the turbidity and the sample of water than collected. At the time of collection the sample contained an appreciable amount of turbidity. This turbidity was due undoubtedly to the short time that the well had been pumped, and due to the moving of the working barrel inside of the well occasioned by the temporary connection at the top of the well. The analysis of this sample is attached to this report and will be discussed later. In view of the inconsistency shown between the bacterial and chemical findings, it was decided that before placing the question of approval of the proposed source or supply before the State Board of Health, another sample should be obtained. Inasmuch as the second well was nearing completion at this time, it was decided to obtain the additional sample from this well. The second sample was collected by one of the assistant engineers on October 31st. Previous to the collection of the sample the well was pumped continuously for forty-eight hours. It was impossible to ascertain definitely the rate at which the well was pumped during this period; it is probable, however, that the rate was between 80 and 100 gallons per minute. At the time of the visit the well was being pumped at the rate of 120 gallons and the water was coming from the well even more turbid than from well No. 1 at the time of the previous visit. This greater turbidity was doubtless due to the increased rate of pumping and the consequent greater motion given to the working barrel inside of the well occasioned by the temporary and loose connection at the top. A sample was collected from this well while discharging at the rate of 120 gallons per minute, and the analysis thereof is attached. During the forty-eight hours of pumping, which was probably at the rate of about 140,000 gallons per day, there was apparently no falling off in the yield of the well.

From a sanitary point of view the quality of water obtainable from wells located on this site will undoubtedly be satisfactory. The two analyses appended to this report, one from each of the two wells, indicate a water of very fair sanitary character with the one exception that the bacterial content per cubic centimeter is higher than is desirable. In the sample collected from well No. 1, the colon bacillus was found in 10 c. c. and 50 c. c. portions but was absent in three 1 c. c. portions. In the sample collected from well No. 2, the colon bacillus was absent in both 1 and 10 c. c. portions. In view of the favorable finding for oxygen consumed, chlorine, and the nitrogen radicals, it would seem that the high bacterial contents noted are attributable to the newness of the well and the unprotected manner in which the top of the well casing was left during the time of the pumping test.

At the time of the collection of the samples from each well, the water contained a considerable amount of turbidity. The persistence of this turbidity in the water obtained from the wells is undoubtedly due to the loose connection between the drop-pipe and the well casing. This connection permits the entire drop-pipe and the working barrel of the pump to move up and down about one-half inch with each stroke of the pump plunger. This motion and the consequent scraping of the sides of the well by the outside of the working barrel undoubtedly cause a considerable amount of shale to be thrown into suspension, and this finely divided shale is undoubtedly the cause of the turbidity noted. With the installation of permanent pumping machinery, which will prevent any motion of the working barrel within the well, and with a more extended period of pumping, the turbidity in all likelihood will entirely disappear. The total iron content in both samples is high. The greater part of the iron, however, in each case is in suspension and in a stable form. In the sample from well No. 1, the total iron content is 1.2 parts per million, and in the sample from well No. 2 it is 3.5 parts per million. In each case the amount of iron in solution is but 0.2 a part per million. The iron in suspension, 1 part and 3.3 parts per million respectively, will be noted to be in almost direct ratio with the turbidities of the two samples, which are reported as 20 and 61 respectively. It is presumable therefore that the high iron content is due to the turbidity and that this suspended iron will disappear after continued use of the well in the same manner that the turbidity will disappear. The water from both wells is comparatively soft for an Ohio ground water.

The analyses of the samples collected from the two wells indicate that with a more permanent pumping equipment and with continued use the objectionable features, namely, the turbidity, high iron content, and the high bacterial count, will entirely disappear.

The construction work on the water works system is progressing rapidly. The reservoir is entirely completed, a large percentage of the mains have been laid, and the foundations for the two pumping stations

have been placed. The work seems to be of very good quality and a satisfactory installation should be obtained in spite of the fact that there has been no careful supervision of the work being done by the contractor.

At the meeting of the State Board of Health held March 2nd, 1911, this report was presented. On account of the fact that the installation had been nearly completed without receiving the approval of the State Board of Health, and also because the water was not entirely satisfactory from a physical standpoint, the Board voted to postpone definite action until June, 1911, in order that an inspection of the supply could be made after the same had been in use for some months. Accordingly, one of the engineering assistants, visited Utica on May 11th, 1911, made an inspection of the works and collected several samples of water. Based on information obtained from him, the following report was submitted:

During the recent inspection it was learned that the works had been in operation since January first of the present year, although they have not yet been turned over to the village by the contractor. There are today about forty house connections, and the water is in addition being used for sprinkling the streets. The present daily consumption is about 50,000 gallons.

The original wooden roof of the reservoir shortly after completion was blown off and has been replaced with a concrete one having openings which provide easy access to each division of the reservoir. The informal recommendations of the Board, for providing drains and overflows in the reservoir, have not been carried out. This, however, is a matter which may not be considered to be of strictly sanitary significance.

In regard to the quality of the water, our recent analyses have shown a decided improvement over the original quality of water from test wells. That is, the water has improved from physical, chemical and bacterial standpoints during the several months it has been used. The iron which was at first found in objectionable quantities has become greatly reduced and apparently causes no discoloration. There seems to be no reason, therefore, why the supply cannot be approved.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health considered the public water supply of Utica, as shown on plans and specifications submitted by Samuel S. Wyer, consulting engineer, on August 23rd, 1910, which plans had in effect already been carried out, and the same was approved.

Attention of the board of trustees of public affairs was called to the advice given them under date of November 19th, 1910, recommending that they install the drains and overflow in the reservoir.

EXAMINATION OF WATER FROM UTICA.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10299	1911 May 11	7	none	none	none	0.15	.042	.062	.002	.8
10300	May 11	0	2	none	none	0.05	.006	.034	.002	.6
10301	May 11	0	5	none	none	0.05	.020	.164	trace	trace
10302	May 11	0	1	none	none	0.	.010	.002	trace	1.4

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10299	4.5	136	25	.....	235	29	.2	2000*	Pos. in 10 cc.*
10300	5.	138	30	.....	231	22	.4	350	Neg. in 10 cc.
10301	5.5	166	37.50	.....	291	25	.3	650	Neg. in 10 cc.
10302	3.5	124	32.5	.....	202	25	.15	350	Neg. in 10 cc.

Source of Samples.

No. 10299. Reservoir. Sample taken by direct submergence.

No. 10300. Tap at Hall's restaurant. Sample taken from faucet.

No. 10301. Drilled well No. 1, 175 ft. deep. Sample taken from pet cock on pump. Public supply.

No. 10302. Drilled well No. 2, 150 ft. deep. Public supply well.

*Accidental pollution during sampling. Very unsatisfactory method of securing sample.

EXAMINATION OF WATER FROM UTICA.

PROPOSED PUBLIC SUPPLY.

Parts Per Million.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
9894	1910									
9978	Oct. 10	none	20	slight	none	.40	.040	.260	0.0	.6
	Oct. 31	2	61	dec.	none	.35	.024	.052	0.0	1

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
9894	3	140	55	.....	258	23	1.2	840	{ Pos. 10 cc.
9978	2	132	45	.....	293	39	3.5	2100	{ Neg. 1 cc.
									{ Neg. 10 cc.

	Dis. Solids	Loss on Ignition	Dissolved	Iron	Suspended	Bact. per cc. field
9894.	240	32	.2		1.0	700
9978.			.2		3.3	

Source of Samples.

9894. Well No. 1.
 9978. Well No. 2.

REPORT ON PLANS FOR A WATER PURIFICATION PLANT FOR WAVERLY.

On January 12th, 1911, there were received from The Roberts Filter Manufacturing Company plans for a water purification plant for Waverly, such plans being submitted to the State Board of Health at the direction and with the authorization of Mr. E. P. P. Smith, village clerk. The plans were referred to the engineering department and the following report was made:

At a meeting held October 20th, 1910, the State Board of Health considered the question of proposed water supply for Waverly and the local officials were notified that "the wells located on land south of the electric light power house and west of Crooked Creek at the edge of the village of Waverly were approved provided a purification plant of a design satisfactory to the State Board of Health is installed and placed in operation before the water is offered to the consumer."

In accordance with the above action, plans for a purification plant are now submitted. These plans show in brief, two wooden tub mechanical filters made by The Roberts Filter Manufacturing Company, contractors for the work, together with sedimentation tanks and chemical apparatus. The filters will be located inside the pumping station, and the sedimentation tanks just outside.

The water from the new driven wells will be raised by means of compressed air into a receiving basin, from which it will be pumped into two sedimentation tanks and chemical treatment tanks, each 24 feet in diameter and 12 feet deep, and holding some 10,000 gallons. From these the water will pass by gravity on to and through the filters, and thence to the filtered water well. From the latter the high service pump is to raise it into a standpipe of 120,000 gallons capacity, located on a neighboring hill.

The primary reason for purifying the new water supply of Waverly is to remove the iron with which the water is badly impregnated, and also to soften the water. Incidentally this treatment will doubtless effect a bacterial purification which would guard against possible danger of contamination of the wells by reason of their being located near the village. Lime and soda ash, in suitable quantities, after being mixed in solution tanks located in the pumping station, are to be introduced into the force main leading to the sedimentation tanks where the reaction will take place and where the precipitated ingredients will settle out. By means of a float valve, the settled water, which passes to the filters, will at all times be drawn from the surface.

The filters consist of two wooden stave tanks, held together by iron rods, said tanks being 8 feet in diameter and $6\frac{1}{2}$ feet deep. The strainer system consists of a cast iron manifold passing through the center of

the bottom of the filter, into which $\frac{1}{4}$ -inch extra heavy wrought iron laterals connect at intervals of 8 inches. An independent air system of brass piping is provided in order to agitate the filtering material during washing. On the bottom of the filters is to be 8 inches of gravel and above this 3 feet of sand. The necessary valves and connections for applying the raw water, drawing off the filtered water, and applying the wash water, are shown on the plans. In addition there are to be loss of head gages and rate controllers.

On the basis of operating the filters twelve hours each day, the rate of filtration will not exceed 84,000,000 gallons per acre per day when the daily water consumption of the village reaches 100,000 gallons, which it probably will not do for some years. It would seem, therefore, that in view of the character of the service required of the plant, the plans should be approved.

ACTION OF THE BOARD.

At its meeting held January 25th, 1911, the State Board of Health considered the plans for a softening and deferrization plant for the village of Waverly, consisting of sedimentation tanks and mechanical filters, as shown on plans submitted January 12th, 1911, by The Roberts Filter Manufacturing Company and approved the same upon the condition that the plant be installed and placed in operation before the water is offered to the consumers.

The authorities were notified that before the approval became effective a statement showing chemical reactions expected and percentage of iron which in the opinion of the filter company would be removed from the well water should be furnished the State Board of Health. Such statement was filed with the Board by the filter company on the 18th day of March, 1911.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR WILMINGTON.

On July 10th, August 3rd and August 15th, 1911, one of the engineering assistants visited Wilmington for the purpose of collecting samples of water from proposed additional public supply wells, and also making an examination on the ground. The following report was submitted:

Owing to a shortage in the water supply during the present summer, the Wilmington Water and Light Company through its manager, Mr. J. C. Martin, has proposed several sites for additional public supply wells.

The first new location recently proposed, namely, the R. B. Peale farm, $1\frac{1}{4}$ miles northeast of the pumping station, has proved unsatisfactory owing to the failure to find an adequate supply of water. A test

well was put down on this site at a depth of 406 feet. This well was located on a knoll, the highest point of the surrounding country being approximately 50 feet above the general level of the ground at the pumping station. The reason for selecting a high point for the location of the wells was presumably for the purpose of obtaining a gravity flow to the pumping station. From a sanitary standpoint the site on the Peale farm is satisfactory, as there are no habitations within 450 feet of the proposed well and the surrounding country is very sparsely settled. All surface drainage is away from the well and in a southwesterly direction.

Test Well on Peale Farm. A test well on the Peale farm was put down with a view to determining the quantity and quality of water available in this locality. The well was drilled to a depth of approximately 406 feet, but it was the testimony of Mr. Martin that a rather loose material was encountered at this depth which filled up the hole some 20 feet. The formations penetrated are as follows:

Clay	18	feet
Limerock	17	"
Coarse gravel (slightly waterbearing).....	7	"
Limestone	60	"
Rock and shale	200	"
Shale	100	"
Sandstone	4½	"

A small quantity of water was found in the coarse gravel at a depth of 42 feet. This, however, was cased off. Water was also encountered at a depth of 102 feet between the limestone and shale, though not in appreciable quantities. It was stated by the well driller that the greatest quantity of water was derived from the sandstone at a depth of 400 feet. The water level in the well at the time of the visit was 14 feet below the surface of the ground.

The well was tested for yield by means of air lift. Air was furnished from a power-driven air compressor having an air cylinder 10 inches in diameter with a 12-inch stroke. The compressor was belt driven by an 18 horse power traction engine furnishing an average steam pressure of 100 pounds. The average speed of the compressor was roughly estimated to be 75 strokes per minute. At this rate approximately 40.5 cubic feet of free air was compressed per minute. No pressure gage or equalizing tank was provided, the air being conducted directly from the air cylinder through a ¾-inch air line to the wells. The air line extended a depth of 140 feet into the well, the lower end being provided with a Harris air nozzle placed so as to extend upward into a 3-inch discharge line. Under the above conditions the average quantity of water discharged from the well was roughly estimated to be not over 30 gallons per minute. The water level in the well during the test was reduced 35 feet. In view of the poor yield of the well on the Peale farm, that site has been abandoned.

Infirmary Site. The site most recently proposed for additional public supply wells is located on the county infirmary grounds, just outside the southeasterly corporation limits and $1\frac{1}{8}$ miles from the center of the village. The nearest habitations are two houses, 600 and 1,000 feet to the northeast. From the standpoint of proximity to habitations the site is suitably located.

The only objectionable feature with respect to the site on the infirmary grounds is the proximity to an abandoned limestone quarry which is partly filled with water. A well was recently put down and is located 30 feet from the east bank of the quarry and the top of the well is approximately 16 feet above the surface of the water. The quarry is 150 feet long by 110 feet wide and has a maximum depth of about 20 feet. The water in the quarry is derived largely from underground sources, there being but a small amount of surface drainage entering it.

The surface drainage in the vicinity of the well and the quarry is in a southwesterly direction through a small stream which flows about 50 feet west of the quarry and 160 feet west of the well and discharges into Lytles Creek. The flow in this stream is not perennial. The apparently strong flow of water in the quarry from the creviced limestone formations was the chief factor which led the water works authorities to put down the test well in this locality.

The well is 8 inches in diameter and was drilled to a depth of 253 feet, penetrating the following formations:

Yellow clay	6	feet
Limestone	32	"
Shale	14	"
Blue limestone (waterbearing).....	32	"
Red clay	$2\frac{1}{2}$	"
Hard blue limestone.....	12	"
Shale	132	"
Limestone	3	"
Shale	2	"

Practically all of the water is derived from the limestone at a depth of 75 feet. At this point the flow is thought to be from the northeast. The well is cased with 8-inch cast iron casing to a depth of 14 feet, and during the test water was discharged from the well through a 3-inch discharge line 100 feet in length. The normal water level in the well is 10 feet below the surface of the ground, and after continuous pumping it was lowered 20 feet.

Two short pumping tests were made, July 31st to August 3rd, and on August 15th, 1911, at which time samples were collected and shipped to the laboratory for analysis. The tests were made with the same equipment as was used on the Peale well, with operating conditions

essentially the same. The average rate of discharge during both tests was estimated to be 60 gallons per minute.

Quality from Well on Infirmary Grounds. The samples collected on August 3rd, 1911, proved unsatisfactory, due to the very high bacterial count very likely resulting from the entrance into the well of cylinder oil used for lubricating the air cylinder. On August 15th, another set of samples was collected, the analytical results of which indicated the water to be of satisfactory quality from a sanitary standpoint, although somewhat hard and with an iron content considerably above the limit of precipitation. Simultaneously with the collection of samples from the well, samples were collected from the quarry with a view to showing any connection which might exist between the quarry and the well. The analytical results indicate these waters to be of apparently different sources.

SUMMARY.

The following salient points may be noted:

1st. At present there is a shortage in the water supply of Wilmington, which is a violation of the terms of the franchise, and which has resulted in considerable complaint on the part of the consumers.

2nd. A test well put down on the R. B. Peale farm showed after continuous pumping an inadequate yield.

3rd. The well on the infirmary grounds is suitably located as regards surface contamination. The yield of this well, although not very great, will add materially toward obviating the present shortage. Analytical results of a sample collected from this well indicate a water suitable for domestic and drinking purposes and of better quality than is obtained from the present public supply wells. It is the intention of the water works officials to install several more wells on this site, providing it meets with the approval of the State Board of Health. There are no indications that the water from the quarry nearby enters this well, although such a condition may develop later after more continuous pumping.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health considered the question of an additional water supply for Wilmington, and the site located on the county infirmary grounds was approved for an additional public supply well.

At a meeting of the State Board of Health held October 18th, 1911, complaints having been made, Mr. J. C. Martin, manager of the Wilmington Water and Light Company, appeared before the Board and submitted data concerning the water supply. A recommendation was

adopted, advising the company to confer with all complainants and endeavor to come to an understanding in regard to the ability of the water company to improve its water supply.

EXAMINATION OF WATER FROM WILMINGTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10455	1911 July 10	6	14	dist.	none	.024	.954	.001	2.2
10600	Aug. 3	4	5	sl.	sl. veg.	.042	.862	.001	0.2
10654	Aug. 15	7	5	sl.	sl. musty	.066	.890	.0112	1.
10655	Aug. 15	7	23	v. dist.	musty (str.)	1.190	.022	.001	0

Sample Number.	Oxygen Required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on Evaporation		Bacteria	
						Total.	Loss on Ignition.	Number per cc.	Colon Present.
10455	.38	16.	298	7.5	.4	363	38	3750	Not in 10 cc.
10600	.24	40.	376	0.	.8	368	39	450	Pres. in 10 cc.
10654	.53	22.	363	0.	.7	399	48	200	Not in 10 cc.
10655	3.45	7.5	196	12.5	.7	270	63	1000	Not in 10 cc.

Source of Samples.

No. 10455. Proposed additional public supply well on farm of R. B. Peale, 1½ mile southwest of pumping station. Sample taken from air lift discharge.

No. 10600. Well on infirmary grounds. Well 30 feet from abandoned stone quarry. Sample collected from pump discharge.

No. 10654. Well on infirmary grounds. Sample from air lift discharge.

No. 10655. Stone quarry on infirmary grounds. Sample collected by submergence near south bank.

All of the above samples were collected by Mr. M. Z. Bair.



SEWERAGE AND SEWAGE
PURIFICATION

(249)

REPORT ON PROPOSED STORM SEWER FOR ADA.

On February 25th, 1911, the following communication was sent to Ada:

"TO THE MAYOR AND COUNCIL,
Ada, Ohio.

Dear Sirs:—I enclose herewith an order of the State Board of Health, duly approved by the Governor and the Attorney General, requiring the village of Ada to purify its sewage, in a manner satisfactory to the State Board of Health, within five months from the date the said order was approved by the Governor and the Attorney General, namely, July 24th, 1911.

Yours truly,

(Signed): C. O. PROBST,
Secretary."

Enclosure.

Since receiving this order the village officials have made some study of the problem of purifying the sewage of the village, and they have come to the conclusion that with available funds it will be impossible at present to make the necessary improvements in the sewerage system and to construct a suitable purification plant or plants which will satisfactorily treat the sewage at all times. The officials, therefore, have requested engineering advice from the State Board of Health as to the best method of procedure under the existing circumstances.

At a meeting of the State Board of Health, held April 21st, 1911, the mayor of Ada was present and argued that it was practically impossible for the village to install a sewage purification plant, and, furthermore, urged the uncertainty as to just what the income of the village would be in the pending change in tax laws.

At this meeting the Board voted to postpone the enforcement of its order requiring the village of Ada to construct a sewage purification plant, the time when this order was to take effect to be fixed at a subsequent meeting of the Board; hoping that the new tax duplicate would enable them to construct such a plant without too great hardship.

At a meeting of the State Board of Health on August 10th, 1911, the mayor of Ada, Dr. L. W. Campbell, together with Mr. J. C. Poling, county surveyor of Hardin County, verbally presented to the Board a plan for constructing storm sewers at Ada. The Board voted to refer the matter to the engineering department. On August 12th plans of the proposed sewers were received from the county surveyor, and on August 17th an inspection of the sewerage conditions was made by the assistant engineer. The following report was submitted:

Ada is a village of 2500 population, located in the northwestern corner of Hardin County and near the headwaters of the Ottawa River.

The locality is very flat and has a clayey soil underlaid by limestone at a depth of a few feet. The main portion of the village is drained by means of short lines of storm sewers discharging into a county sewer, which follows a ravine extending through the corporation and discharging into the Ottawa River some distance to the north. The eastern portion of the village is drained by a system of storm sewers discharging through a single outlet into a small stream which is tributary to the Ottawa River. The sewers of the village have been constructed as needed, usually with open jointed, vitrified sewer pipe, and sometimes of ordinary field tile. The sewers were intended principally for storm water removal, but have come to be used to some extent to receive overflows from cesspools.

Present Sewerage Conditions. The sewers at Ada are in substantially the same condition as described in previous reports. The misuse of the sewers to receive domestic sewage is of limited extent and examinations at the sewer outlets have shown but a small dry weather flow. For the removal of storm water, however, the sewers are in their present condition inadequate. This is due principally to the improper construction of the old county sewer, which does not remove the drainage water reaching it. In places this sewer has caved and broken and is partly obstructed and in bad alignment. The result of this condition is serious in certain portions of the village and with continued rains the surface of the ground is frequently flooded. It is principally to correct these conditions that the present project is proposed.

The sewers of the eastern portion of the village which drain into the small stream before referred to will not be affected by the improvements. The stream which receives the drainage is small and has no flow in extremely dry weather. With these conditions even the very small dry weather sewage flow creates a nuisance in the course of the stream, and foul odors and unsightly conditions are complained of. This stream reaches the Ottawa River and the foul deposits are washed into the stream periodically following rains. This condition is serious, as it is at such times that the water supply from Lima is drawn from the Ottawa River.

Proposed Sewerage. The sewerage improvements to be made by the county commissioners to provide drainage for the village of Ada are substantially to consist in a reconstruction of the present county sewer. The old double line of 24-inch sewer following a depression called "Swag Run" is to be abandoned and a 48-inch brick outlet sewer is to be built. This new sewer will discharge into the Ottawa River at a point about $\frac{1}{2}$ mile east of the present outlet. Two other lines of sewers, which at present discharge into the double 24-inch line, are to be reconstructed in order to provide freer drainage.

SUMMARY.

It will be seen from the above report, as well as from information which has been presented to the State Board of Health during the past year, that the storm sewers at Ada, constructed by the county, are being misused and are contributing pollution to the Ottawa River, thus endangering the water supply of Lima.

The proposed reconstruction of the present sewers and the change of location of the outlet, while not constituting, strictly speaking, a new system, nevertheless provides for a more thorough draining of the village. If the present sanitary connections with the new sewers are allowed to continue (thus making the county sewers in effect combined sewers) there will be no motive, on the part of the people of Ada, for installing the proposed system of sanitary sewers with sewage purification in accordance with the Bense order, issued last spring, the enforcement of which has been temporarily suspended in compliance with a petition from the local officials, pleading lack of funds.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health approved the plans for proposed storm sewers at Ada, submitted by Mr. J. C. Poling, county surveyor, on August 12th, 1911, upon the following conditions:

1st. That the village council, by ordinance, compel the removal of all present sanitary connections with all sewers leading into the proposed outlet, and, furthermore, prohibit any future sanitary connections with such sewers; and,

2nd. That a certified copy of this ordinance be filed with the State Board of Health before construction of the proposed sewers is commenced.

The village council prepared an ordinance prohibiting future sanitary connections to the present sewer system, but did not propose to remove existing connections believing that by so doing conditions would prevail which would be deleterious to the general health of the community. They asked the Board to reconsider its action taken September 14th, and the request was considered by the Board at its meeting held October 18th, 1911, and the latter laid upon the table. In December an ordinance was submitted to the State Board of Health which did not conform to the requirements of the Board and was returned for correction.

REPORT ON PROPOSED CHANGE OF LOCATION OF PROPOSED SEWAGE PURIFICATION PLANT FOR ANDOVER.

On December 6th, 1911, a communication was received from Mr. J. W. Cook, clerk of the board of trustees of public affairs of Andover, requesting approval of a proposed new location for sewage purification works. On December 12th, 1911, one of the engineering assistants visited Andover and inspected the proposed site. The following report was submitted:

In May, 1910, general plans for sewerage and sewage purification works for the village of Andover were approved by the State Board of Health with the following conditions:

"1st. That before any contracts are let there be submitted to the State Board of Health complete plans embodying certain changes of detail in the design of the purification works satisfactory to the engineer of said Board;

"2nd. That a small shelter house be built at the site of the purification works for the convenience of the caretaker;

"3rd. That the village maintain accurate and complete records describing and giving the location of all house connections, and that all house connections be inspected during construction by a representative of the village; and,

"4th. That this approval be considered void unless contracts shall have been awarded on or before January 1st, 1912."

In anticipation of the submission of the plans which were approved in May, the acting chief engineer visited Andover in March, 1910, for the purpose of examining proposed sites. The site, which was approved by the Board in connection with the approval of the preliminary plans, is located in the valley of the southerly branch of Gravel Run, some 1600 feet east of the easterly corporation line and about $\frac{3}{4}$ -mile from the built up portion of the village. The site is well removed from dwellings being about 600 feet from the two nearest houses. Within 1500 feet of the site there are not more than four or five dwellings. In the acting chief engineer's report of May 6th, 1910, this site is commented upon as follows: "On the whole it may be said that the site is well selected, and if the operation of the purification works is properly attended to there should result no objectionable odors which will reach habitations in the vicinity."

The village has experienced difficulty in securing the above described site which cannot be purchased without condemnation proceedings and it is, therefore, desired to secure a new site. The site now proposed is known locally as the Mack site and is located in the valley of the southerly branch of Gravel Run, some 200 feet west of the site first selected. This new site will be easily secured as the land has no value for agricultural purposes. With respect to its proximity to habitations,

the Mack site is equally as suitable as the one formerly approved, although it is somewhat nearer the corporation line of the village. In some respect the Mack site is superior to the first selected site as it is shielded from a road, which passes about 800 feet to the north, by an embankment 10 or 12 feet above the elevation of the stream. The selection of the Mack site will not necessitate a change in the location or grade of the main trunk sewer, or the design of the sewage purification works as originally planned. In order to secure the necessary area, which is three acres, the course of the stream will have to be shifted around the limits of the site. Owing to the small watershed of the stream no difficulty should be experienced by severe floods.

It is important to note that in the approval of this site cognizance should be taken of the necessity of the installation of a plant of the type shown on the preliminary plans approved in May, 1910, consisting of tanks and intermittent sand filters.

ACTION OF THE BOARD.

At a meeting held December 20th, 1911, the State Board of Health approved the proposed change in location of the sewage purification works at Andover, which change contemplated the use of the Mack site, so-called, as outlined in a communication from Mr. J. W. Cook, clerk of board of trustees of public affairs, received December 6th, 1911, upon the following conditions:

1st. That before any contracts for sewers or sewage purification works are let there be submitted to and approved by the State Board of Health, detailed plans of a plant of the type shown on preliminary plans approved in May, 1910.

2nd. That no connections to the sewers be made prior to the completion of the sewage purification work; and,

3rd. That this approval be void unless contracts for the construction of the sewers and sewage purifications works shall have been awarded prior to January 1st, 1913.

REPORT ON ADDITIONAL SEWERAGE FOR BATAVIA.

On September 8th, 1911, there was received from Mr. Thomas Glancy, a plan for proposed additional sewerage for Batavia. This plan was referred to the engineering department and the following report submitted:

From previous investigations the chief engineer is familiar with the conditions in the village as they existed in 1903 and 1906. In 1904 the State Board of Health approved of an outlet (which was never built) at the same point as that now proposed; provided that the sewer be used only for cellar and bath tub drainage.

The plan submitted provides for the construction of a 10-inch sewer in Water Street, paralleling the east fork of the Little Miami River and intercepting the flow from the existing sewers in Spring Street, Main Street, and North Street. The proposed sewer will have a total length of about 1400 feet and the outlet is to be located near the center of the channel of the east fork of the Little Miami River a short distance south of Wood Street.

As stated in a former report of the chief engineer regarding the location of a sewer outlet at the point now proposed, the discharge of untreated sewage will undoubtedly create a nuisance. The average flow of the stream, while affording a fair degree of dilution, is insufficient to receive the ultimate sewage flow from the village and at all times prevent a nuisance. It is, therefore, apparent that some means of treatment of the sewage must be provided. For the present, partial purification or clarification by sedimentation will probably be sufficient, but ultimately, complete secondary treatment will be required.

ACTION OF THE BOARD.

At its meeting held October 18th, 1911, the State Board of Health approved this plan, submitted by Mr. Thomas Glancy, provided the village first have prepared plans for sewage purification, satisfactory to the Board, consisting of tanks and filters, and that the tanks be constructed as soon as the sewers are built and used until such time as, in the judgment of the State Board of Health a nuisance is found to result from the discharge of the effluent into the river; and whenever such nuisance is found the village shall install the filters.

REPORT ON PROPOSED SEWAGE PURIFICATION AT BEACHLAND.

At a meeting of the State Board of Health on September 14th, 1911, there was considered a communication from Mr. H. D. Messick, attorney for the Citizens Savings and Trust Company, acting on behalf of Mr. F. B. Hall, owner of property adjacent to Beachland, complaining against sewerage conditions at Beachland. This communication was referred to the chief engineer, who made an investigation on September 19th, 1911, and submitted the following report:

Beachland is a small community or summer resort, located on the shore of Lake Erie, within the corporate limits of Nottingham, about eight miles east of the center of the city of Cleveland. At present there are said to be about 80 cottages in the settlement and the estimated population is 250. This estimate appears too low to be consistent with the number of cottages, but the local engineer explains this by stating that there are very few children or servants at Beachland. The cottages

are all connected with a common sewer which discharges into an inadequate tank on the shore of the lake, which tank overflows and pollutes the beach. This condition has been a source of complaint for some years and was investigated by the chief engineer in 1905, his report being printed in the Annual Report for that year on page 208.

During the recent investigation it was learned from Mr. E. B. Wright, engineer for Beechland, that independently of him, the residents had recently contracted with Mr. George Anderson, said to be a brick mason, to install a plant of his own design, for which \$150 was to be paid.

Upon obtaining this information Mr. Anderson's attention was called to the fact that all plans for proposed sewage purification plants or for additions to existing plants must receive the approval of the State Board of Health before being carried out. Accordingly, Mr. Anderson ceased work and submitted a sketch of his proposed scheme, which in brief consists of a tank on the shore of the lake into which the sewage from the old tank is to be discharged and from which the effluent is to pass on to a long, narrow sand filter, 50 by 5, which gives an area entirely inadequate for the purpose.

Mr. Anderson's sketch was informally reviewed by the engineering department and he was notified that said department believed it to be "inadequate and unsuitable for local conditions."

ACTION OF THE BOARD.

At a meeting held October 18th, 1911, the State Board of Health disapproved the scheme proposed for the purification of the sewage at Beachland, as shown on sketch submitted by Mr. George Anderson, September 22nd, 1911. The Board voted to advise the health officer of Nottingham that he should notify the residents of Beachland that they should install a sewage purification plant of ample capacity for present and future needs designed in accordance with modern practice.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR BRYAN.

On February 13th, 1911, there were submitted by The Riggs and Sherman Company of Toledo, consulting engineers for Bryan, plans for a sewage purification plant for that village. These plans were referred to the engineering department and were considered in connection with the trunk line sewer plan which shows the site proposed for the purification plant and which had been submitted in June, 1910. The following report was made:

The village of Bryan, having a population of 3,641 according to the 1910 census, is located in the extreme northwestern part of the state

and is the county seat of Williams County. The topography of the village, typical of that section of the state, is comparatively level; and the drainage is in general toward the east and southeast into two small intermittent streams known as Lynn Run and Joe Run.

Bryan is primarily a farming center, though it has several industries; the one which is most significant as regards this report being the Van Camp Packing Company's condensed milk plant.

Existing Sewerage Conditions. The existing sewerage of the village consists of a number of poorly constructed drains originally intended for storm water but used to receive various domestic wastes including the discharge of water closets and cesspools. Some of these drains are owned privately and some have been built by the village. It is estimated that at the present time about fifteen to twenty per cent of the total population is tributary to these sewers, and the resultant sewage causes serious nuisance in the runs above mentioned which receive the same.

Since the establishment of the Van Camp Packing Company's condensed milk plant early in 1909, the objectionable conditions in Lynn Run and Joe Run, the latter being tributary to the former, were increased by the discharge from the condensed milk plant of about 200,000 gallons per day of waste water containing enough milk to make the liquid highly putrescible.

Action by the State Board of Health under the Bense Act.

On August 23, 1909, there was received from Mr. John P. Fisher, clerk of Pulaski Township, a petition requesting the State Board of Health to take action under the Bense Act to the end of requiring the village of Bryan to purify its sewage. No complaint was made directly against the Van Camp Packing Company, apparently for the reason that the citizens of Bryan as an inducement for the company to locate in that place, had agreed to provide sewerage facilities for the plant.

The complaint above mentioned was referred to a committee of the Board consisting of Dr. Chapman and the acting chief engineer. This committee visited Bryan on September 3, 1909, and made a thorough investigation of the local conditions, which were found to be essentially as described above. It was also learned that the bonded indebtedness of the village was above the legal limit and that, under the authority of the Bense Act, only \$27,520 could be raised for sewerage and sewage disposal purposes.

The committee made the following recommendations, which were adopted by the Board:

"1st. That the village of Bryan be required to engage the services of a competent consulting engineer well versed in sewerage and sewage disposal matters, for the purpose of preparing plans and estimates of a system of sewers and sewage purification works adequate for meeting the needs of the village and

yet capable of being built within the present financial means of the municipality. It is assumed that this can be accomplished by a proper apportionment of the part of the work to be paid out of general village funds and the part to be paid for by special assessment of benefited property owners.

"2nd. That the plans and estimates prepared in the manner above outlined be submitted to the State Board of Health not later than May 1, 1910, to serve as a basis for further action by that body.

"3rd. That the Van Camp Packing Company be required to purify the wastes from its condensed milk plant in a manner satisfactory to the State Board of Health, by October 1, 1910.

"4th. That the Van Camp Packing Company be informed that the State Board of Health is willing to assist the company to the extent of furnishing such general information in regard to the character of wastes, methods of treatment, etc., as will enable the company to properly design and construct a satisfactory purification plant."

Proposed Plans. In accordance with the above recommendations, the village retained in the spring of 1910 The Riggs and Sherinan Company of Toledo to prepare plans for sewerage and sewage purification, and plans for the latter are now submitted. No definite plans for a proposed sewerage system have been prepared, other than a trunk line sewer plan submitted June 28, 1910, which shows the proposed site for the purification plant.

At the request of the consulting engineers and in accordance with the above recommendation No. 4, the State Board of Health made an investigation of the wastes from the condensed milk plant of the Van Camp Packing Company with reference to determining the best method of purifying same. The results of this investigation showed that while the total output of waste water was some 200,000 gallons per day, only about one-tenth of this amount, or 20,000 gallons was of such a nature as to render purification necessary. It was accordingly recommended to the consulting engineers that the first step toward solving the problem would be to separate the clear water, used for cooling purposes, from the water which was contaminated with milk. The Van Camp Packing Company after some delay has consented to make this separation of the wastes, thus leaving but 20,000 gallons per day to be cared for, and this quantity is to be discharged into the village sewers and conveyed together with the domestic sewage to the village purification plant.

Although the present population of Bryan is about 3,600, it is expected that only 1,000 persons will use the sewers for some time in the future. One of the reasons for this opinion is that the village is not financially able to sewer the entire town at present. On a basis of 100 gallons per capita, the total flow of domestic sewage would be 100,000 gallons; and adding to this, 20,000 gallons of wastes from the condensed milk plant, makes a total of 120,000 gallons. The classification of connections to be expected immediately are one condensed milk factory, three hotels, thirty stores, and 150 residences.

The method of purification proposed is screening, sedimentation, and intermittent sand filtration. The site selected for the purification plant is located one and three-fourths miles southeast from the center of the village on land immediately northwest of the junction of Lynn Run and Big Ditch. The site is admirably located, there being no houses within more than 500 feet.

Big Ditch, which will receive the purified sewage, has a continuous though rather small flow throughout the year owing to the water received from numerous flowing wells on its watershed. A measurement of the discharge of this stream, taken July 30, 1910, showed less than one cubic foot per second. The water of Big Ditch ultimately reaches the Maumee River, but many miles above any public water supply.

The 24-inch main sewer on reaching the plant first enters a screen chamber of oval shape, dividing it into two channels. Each channel has a double screen, the coarser of which has an open space of $1\frac{1}{4}$ inches and the finer an open space of $\frac{3}{4}$ inch. The screened sewage then enters a circular brick pump well 12 feet in diameter and 11 feet 6 inches deep below the flow line. Over this pump well is a brick building 10 feet 8 inches by 6 feet 8 inches in plan, which contains a 5-horse power automatically controlled electric motor driving through a system of beveled gears a vertical centrifugal pump having a 3-inch suction.

The 6-inch cast iron force main from the pump raises the sewage from an elevation varying from 26 feet to 14 feet into the sedimentation tanks.

The sedimentation tanks are two in number and are of reinforced concrete, uncovered. They are 85 feet long with an average depth of about 10 feet, the deepest point being near the upper end. One of the tanks is 9 feet wide and the other 12 feet wide, and their combined capacity is 94,000 gallons, or about eighteen hours' flow based on the nominal capacity of the plant; although a much shorter sedimentation period may be used if found desirable. At the low point in each of the tanks is a 12-inch outlet controlled by a sluice gate, through which the tanks may be drained on to a specially prepared sludge bed.

Adjacent to the lower end of the sedimentation tanks is the controlling house covered by a brick building in which are to be located six automatic siphons, each connected with a filter, which siphons will under normal operation discharge in rotation. The dosing tank is 22 feet by 12 feet in plan and 4 feet deep, thus giving a dose of 7,500 to 8,000 gallons at each discharge. This dose is sufficient to flood one filter, which has an area of 11,000 square feet, to a depth of only about 3-8 inch at each discharge. It will be seen that this dose is too small to obtain favorable distribution and the size of the dosing tank, therefore, should be increased.

The sand filters, which are placed adjacent to or very near the

tanks, are six in number, each having an area of 11,000 square feet, thus giving a total area of $1\frac{1}{2}$ acres. In addition, there is a sludge bed 36 feet wide and 100 feet long. The filters are to be enclosed by earthen embankments and are to contain 6 inches of broken stone and 6 inches of gravel, over which is to be 2 feet of sand. They are to be underdrained by parallel lines of 6-inch tile pipe about 20 feet on centers. The main underdrains are 12 inches in diameter. The sewage will be distributed over the surface of the sand by means of galvanized iron carriers with adjustable outlets at frequent intervals.

The rate of filtration proposed is liberal, being 80,000 gallons per acre per day. One acre will receive daily the sewage from 6,700 persons plus 14,000 gallons of milk wastes. In designing the plant, there was taken a basis of 1,000 persons or 100,000 gallons daily of sewage per acre, and in addition it was assumed that about three times as much area would be necessary to purify 20,000 gallons of milk wastes than would be necessary for 20,000 gallons of domestic sewage.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health considered the plans for a sewage purification plant for Bryan, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, February 13th, 1911, and to be located on the site shown on the trunk line sewer plan submitted June 28th, 1910.

These plans were approved provided:

- 1st. That the village purchase at least five acres of ground as a site for the purification plant;
- 2nd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;
- 3rd. That detailed plans of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed;
- 4th. That the capacity of the dosing tank be enlarged so that each filter will be flooded to a depth of at least 2 inches at each dose; and
- 5th. That this approval be void unless construction of the plant is begun before January 1st, 1912.

REPORT ON PROPOSED INTERCEPTING SEWER AND SEWAGE PURIFICATION PLANT FOR BUCYRUS.

On February 23rd, 1911, there were received from The Riggs and Sherman Company of Toledo, consulting engineers, plans for an intercepting sewer and sewage purification plant for the city of Bucyrus. These plans were referred to the engineering department, which through past inspections had obtained full data regarding the local conditions.

The following report was submitted:

The city of Bucyrus, having a population according to the 1910 census of 8122, is the county seat of Crawford County and is situated on the Sandusky River. Measured along the stream, it is sixteen miles below Crestline and twenty-four miles above Upper Sandusky. The surrounding country is rather flat, and the soil is composed of drift deposits which extend to a considerable depth and consist of material of a clayey or gravelly nature. The area within the city corporation limits is about two and one-fourth square miles.

Bucyrus is primarily an agricultural center but also contains several manufacturing industries including foundries, machine shops, clay and wood working machinery factories, and railroad shops. At present there are ten or twelve miles of brick paved streets, a public water supply, and a system of sewers which is herewith briefly described.

Existing Sewerage. Practically all of the city is accessible to the sewers, but only about one-half the population uses them for the discharge of water closet wastes; although nearly all the houses have connections for sink and cellar drains. The existing sewers discharge into the Sandusky River through fourteen different outlets, although most of the sewage passes out through one outlet at a point a short distance below the city.

The discharge into the Sandusky River of the sewage of Bucyrus has been the source of complaint ever since the year 1895, when the Secretary of the State Board of Health made an investigation and report severely condemning existing conditions and recommending that the sewage be purified. During the next fourteen years complaints were received from time to time and investigations made by representatives of the State Board of Health.

Action by the State Board of Health under the Bense Act.

In February, 1909, there was received from the county commissioners of Crawford County a petition complaining against the discharge of sewage into the Sandusky River and requesting the State Board of Health to take action under the Bense Act. A committee of the Board, consisting of Dr. Chapman, member, and the chief engineer, investigated the conditions complained of and submitted a report showing that owing to the discharge of the city's sewage, the river was badly contaminated and conditions created detrimental to the health and comfort of persons living along the stream below the city; and furthermore, that the water supplies of Upper Sandusky, Tiffin, and Fremont, were probably affected to some extent.

After giving the local officials an opportunity to be heard, and after some further delay, due to the fact that it was expected that said officials would proceed to remedy conditions without receiving a definite order from the State Board of Health, the Board on December 6, 1910,

with the approval of the Governor and the Attorney General, ordered the city of Bucyrus to purify its sewage on or before October 1st, 1911.

Proposed Plans. With a view of complying with the above order, plans are now submitted for an intercepting sewer and sewage purification plant. The sewer is to follow the Sandusky River from the northeasterly to the southwesterly border of the corporation, and will vary from 10 to 30 inches in diameter. It will receive the dry weather flow of all existing sewers; and the mixture of sewage and storm water, during rains, will overflow and pass into the stream through the old outlets.

As the intercepting sewer and sewage purification works are in capacity sufficient to take care of a flow of 200 gallons per capita, or 400 gallons per person now using the sewers, it is believed that there will be no necessity for discharging sewage into the river at any of the old outlets until the flow has increased to five or six times the dry weather flow. While it is not in accordance with ideal conditions to permit any sewage to pass into the river, yet in view of the great expense involved in installing a new system of domestic sewers for the entire city, it is believed that the proposed plan offers the only feasible plan at the present time. All future sewers, however, should be built on the separate plan and no storm water, cellar drainage, or roof water allowed to enter them.

The sewage purification plant is to be located just west of the southwesterly boundary of the corporation on land adjacent to the river. There are no houses within at least 1,000 feet, and but one or two, if any, within 2,000 feet. The land is sufficiently high to satisfactorily protect the plant against floods, after taking certain precautions in regard to protecting the embankments surrounding the sand filters. The site is therefore satisfactory.

The method of purification proposed consists of: first, treatment in settling tanks; second, treatment in sprinkling filters; and third, final filtration through sand filters. The nominal capacity of the plant is 1,600,000 gallons, which is very liberal when considered in connection with the tributary population.

The main intercepting sewer on reaching a point just across the river from the sewage purification site, discharges into a pump well 30 feet in diameter and 28 feet deep. Just below the inlet of the pump well is a basket screen, which by means of counterweights can be raised to the surface and cleaned. Adjacent to the pump well is a dry pit containing two 8-inch centrifugal pumps belted to electric motors located some 20 feet above in a small brick building. The motors and pumps are to be automatically started and stopped, as the sewage in the well varies between predetermined levels.

The 12-inch cast iron force main from the pump well discharges into the upper end of the settling tanks, which are four in number. Each tank is 24 feet by 149 feet in plan, 5 feet deep at the sides and 9 feet

deep in the center. The total capacity thus obtained is 700,000 gallons, or ten or twelve hours flow. The tanks are to be uncovered and constructed of thin concrete walls heavily reinforced with steel rods. Longitudinally through the center of each tank passes a concrete trough 12 feet wide and varying in depth from 0 to 12 inches. The outlet of this trough is controlled by a 12-inch sluice gate, which permits the tank to be drained on to the sludge filter. The effluent from the settling tanks discharges into a dosing tank 4 feet by 56 feet in plan and having a depth of 3 feet at one end and 5 feet at the other end. When the contents of this tank reaches a depth of 3 or 5 feet, they are discharged into the distributing system of the sprinkling filters.

The sprinkling filters are constructed in four units, each being 75 feet wide and 150 feet long, thus giving a total area of a little over one acre. The depth of the filtering material is 5 feet. The rate of filtration will be about 1,500,000 gallons per acre per day, and the tributary population not over 8,000 per acre. The filters are enclosed by reinforced concrete walls, and the two end walls of filters Nos. 1 and 2 are formed by the side walls of one of the settling tanks.

The 14-inch cast iron distribution pipe passes along the upper ends of all four filters at an elevation of $2\frac{1}{2}$ feet above the bottom. Branching from the 14-inch pipe, at intervals of 12 feet are 6-inch lateral distributor pipes in which 3-inch cast iron risers are inserted every 14 feet. In the tops of the risers, at the level of the surface of the filtering material, are the sprinkling nozzles, which are to be of the Taylor type "or equal."

The underdrainage system of the filters consists of rectangular channels depressed below the concrete floor, 12 inches wide and 8 inches deep. These are covered with slabs, which are raised above the floor at intervals of every foot in order to provide openings for the filtered sewage to enter the channels. The main collector passing along the lower end of all four filters, is 2 feet wide. It is extended by means of a concrete flume to the control house, which is located in the center of the sand filters.

In the control house are to be located six automatic siphons which discharge the contents of the dosing tanks, holding 18,700 gallons, in rotation on to the sand filters. The quantity of the dose together with the inflow during the discharge period is sufficient to flood one filter to a depth of about $1\frac{1}{2}$ inches.

The sand filters are to be six in number and will have a total area of 4 acres. Although not all of the same shape, each will have an area of $\frac{2}{3}$ of an acre, and will contain 3 feet of sand. They will be liberally underdrained by 4-inch and 6-inch tile leading into the main 18-inch drain which discharges into the river. The rate of filtration will be 400,000 gallons per acre per day of sprinkling filter effluent, which will be quite weak in composition,

The plant is of ample capacity for the service which it is to perform. The only feature which is omitted is the provision for settling the sprinkling filter effluent before it passes on to the sand filters. While such omission will not interfere with the quality of the final effluent, yet it is believed that it will necessitate more frequent cleaning of the sand. For this reason a settling basin should be recommended, although its installation is probably not of sufficient importance to warrant making it a definite condition of approval.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health approved the plans for an intercepting sewer and sewage purification plant for Bucyrus, as shown on drawings submitted by The Riggs and Sherman Company of Toledo, consulting engineers, on February 23rd, 1911, provided:

1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed.

2nd. That twenty-five acres of land be purchased as a site for the purification plant.

3rd. That all future sewers in Bucyrus be built on the separate plan, and that plans therefor be submitted to the State Board of Health for approval whenever construction is contemplated; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR CAMP WISE.

On April 5th, 1911, there were received from Mr. Charles W. Root of Cleveland, consulting engineer, plans for sewerage and sewage purification for Camp Wise. One of the engineering assistants inspected this place April 19th, 1911, in company with the consulting engineer. The following report was submitted:

Camp Wise is a charitable organization maintained for the purpose of giving Hebrew children an outing during the summer months. The camp is located twelve miles east of the Cleveland public square and comprises seventeen acres of land, extending from the lake front to the lake road. The buildings consist of nine small cottages for nursing girls; one large dormitory for boys, including dining room and kitchen; the caretakers' cottage; a double cottage for mothers and babies; and a hospital to be constructed. The camp is open from June first until September, during which time the average population is 160, while the present housing facilities will not accommodate more than 200.

The water supply for the camp is obtained from Lake Erie. The water is pumped through a small cast iron suction line which extends about 30 feet from the shore line, to an elevated wooden tank of 3,000 gallons capacity. The daily consumption of water is estimated by the consulting engineer to be approximately 7,000 gallons. It was stated that all water is boiled before being used.

SEWERAGE SYSTEM.

The sewers are to be used for sanitary purposes only, and as planned consist of two 6-inch lines paralleling the lines of cottages, built and proposed, and converging at a point near the bank of a ravine where the purification plant is to be located. The total length of the sewers is 1,400 feet, and all are to be of vitrified sewer pipe six inches in diameter, laid with cemented joints. No underdrains are provided, although extreme care is being exercised to exclude as much ground water as possible. Manholes consisting of three lengths of 2½-foot sewer pipe are provided at intervals from 200 to 300 feet. No provision is made for flushing sewers as this can be done by means of hose. The maximum grade of the sewers is 1.5 per cent, and the minimum 0.8 per cent.

SEWAGE PURIFICATION PLANT.

The purification plant is to be located approximately 1,000 feet north of the lake road and will comprise a septic tank, dosing chamber, and four intermittent sand filters.

Septic Tank and Dosing Chamber. The septic tank and dosing chamber are combined in one structure, built of concrete and covered by means of brick arches. The septic tank is 10 feet long by 6 feet wide, and about 6 feet deep to the flow line, thus giving a capacity of 2,670 gallons or a period of flow of 8.2 hours based on a daily flow of 8,000 gallons. The inlet of the tank consists of a 6-inch vitrified pipe placed 5 feet 9 inches above the bottom. The outlet to the dosing chamber consists of a 6-inch vitrified pipe with its invert 6 feet above the bottom of the septic tank. Midway between the inlet and outlet of the septic tank is placed a 9-inch concrete wall which extends to within two feet from the bottom and which is intended presumably to break up currents and distribute the flow across the width of the tank.

The discharge from the septic tank will enter directly the dosing chamber. This chamber is 10 feet wide, 6 feet 6 inches long, and has an effective capacity from flow line to depth drawn off by siphons of 990 gallons or a storage period of 2.6 hours. The tank is of such size that if the contents thereof were discharged on to the surface of one of the filters, it would flood same to a depth of about 2¼ inches. The automatic apparatus will consist of four siphons, arranged to discharge automatically in rotation. Each siphon is connected to a separate bed.

Filters. Four filters are to be used, each 22 feet wide by 24 feet long. The total area is thus 0.005 acre. The filters are to be constructed in excavation, although the slopes of the sides are not shown on the plans. The filtering material is to consist of lake sand and gravel. Two feet of plain gravel will be placed over the underdrains, and above this two feet of lake sand. Each filter has three parallel lines of underdrains running longitudinally along the bottom. These are composed of 2-inch porous tile laid with open joints. The sewage will be discharged on to the surface of the beds by three lines of 3-inch sewer pipe, laid with open joints and terminate near each corner of the bed. A more equal distribution could be effected by means of a system of wooden distributors with suitably arranged points of discharge. In such a system, however, provisions should be made for regulating the quantity of sewage that may be discharged at each of these outlets. The final effluent will be discharged into a small stream which flows through the southeast corner of the camp property. It was stated by the consulting engineer that only three beds will be used at one time, each of the four beds having a period of rest of one week alternately.

CONCLUSIONS.

In conclusion it may be stated that owing to the proximity of several cottages which are 500 feet north of the purification plant, and a public highway 1,000 feet to the south, some complaints may be made due to unpleasant odors. However, it is thought that by very careful maintenance these may be prevented to a great extent. The location selected is the only one available whereby sufficient head can be obtained for disposal purposes without pumping.

ACTION OF THE BOARD.

At a meeting held May 10th, 1911, the State Board of Health approved the plans submitted by Charles W. Root, consulting engineer, on April 5th, 1911, for sewerage and sewage purification for Camp Wise, located twelve miles east of the Cleveland public square, upon the conditions:

1st. That as soon as the work is completed a caretaker be appointed whose duty it shall be to visit the purification works at least once a day and to maintain them in a manner satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and (Submitted May 29th, 1911, and approved).

3rd. That a more satisfactory method of applying the sewage to the surface of the filters be provided.

Attention was called to the necessity of using a deodorizer, if odors should arise from the plant, and also the desirability of substituting coke properly graded for sand proposed in the filters, the size to be determined by the engineer of the State Board of Health.

REPORT ON PROPOSED SEWERS AT CANAL FULTON.

On July 24th, 1911, a communication was received from Albert Fellmeth, mayor of Canal Fulton, stating that the village contemplated installing a sanitary sewerage system. On receipt of the above communication one of the engineering assistants visited Canal Fulton August 16th, 1911, and in company with the mayor and Mr. F. E. Meyers, of Canton, consulting engineer for the village, made an inspection of the proposed location for sanitary and storm sewers. After a review of the plans the following report was submitted:

Canal Fulton is located in the northwestern part of Stark County on the Tuscarawas River. The population according to the 1910 census is 978, showing a decrease of 194 in the past ten years. The village is essentially a farming community, and besides an electric lighting system and a privately owned and operated water works system, has no municipal improvements.

The village has no sanitary sewers, although there are a number of storm sewers of short length at various points in the corporation, most of which discharge into open ditches which in turn empty into the Ohio Canal or the river.

Recently the village has had plans and specifications prepared by its consulting engineer for approximately 1,500 lineal feet of street paving. In order to avoid the tearing up of the proposed paving in the future, it is intended to install two sewers, each 740 feet long, on Canal Street. Plans and specifications were prepared for the proposed sewers and it was intended to go ahead without the approval of the State Board of Health, a procedure which, as was pointed out to the local council, would be a violation of the state law.

Proposed Sewerage. It is intended to construct storm and sanitary sewers on the separate plan. These sewers extend on Canal Street, the principal street of the village, from the first alley northwest of Market Street to Poplar Street, a total distance of 740 feet. The sanitary sewer is to consist of 8-inch vitrified sewer pipe; while the storm sewer will be 18 inches and 24 inches at the lower end. From Poplar Street both sewers extend in a south-westerly direction a distance of 170 feet to a manhole located on the bank of the Ohio Canal. The sewers have a fall of 9.5 feet from Canal Street to the canal. At the canal manhole the two sewers are combined into a 24-inch sewer which extends a distance

of 355 feet, passing under the Ohio Canal to the Tuscarawas River into which it will discharge. The sewer passes under the Ohio Canal at a depth of 2.9 feet below the bottom of the canal. The outlet into the Tuscarawas River is protected by a concrete bulkhead placed near the water edge and 8.5 feet below the top of the bank, which, at this point, is rather precipitous. As shown on the plans, this outlet will be approximately 2 feet above the bed of the river at its deepest point, and will be submerged only during medium high stages of the river. Four manholes are provided on Canal Street, each of which will take care of both lines of sewers.

It was the testimony of the local authorities that not more than eight house connections would be made to the proposed sanitary sewer during the first year. It is estimated that the greatest number of house connections which may ultimately be made to the proposed sanitary sewer will not exceed twenty.

The outlet into the river will be located 240 feet below the Cherry Street bridge on the east bank of the river. There are no houses within 250 feet of the proposed outlet.

The Tuscarawas River has a watershed of 388 square miles above Canal Fulton. The average flow in the river at this point for the three driest months is roughly estimated to be 6 cubic feet.

SUMMARY AND CONCLUSIONS.

Although the local authorities, who are about to construct the new sewers, do not officially consider that they are installing a new system of sewerage, yet the plan which they propose to carry out would afford a distinct beginning for such a system; and would, furthermore, probably result in the gradual construction, without the approval of the State Board of Health, of poorly arranged sewers to discharge untreated sewage into the Tuscarawas River.

The matter of constructing the sewers at the present time in order to avoid the future inconvenience of tearing up paved streets should be of secondary consideration to the village when compared to the matter of securing a proper sewerage system for the future.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health disapproved the plan for constructing sewers in Canal Street, as shown on plan prepared by Mr. F. E. Meyers, consulting engineers, and submitted on August 16th, 1911, and it was voted to require the village to either postpone construction of sewers or cause to be prepared plans, satisfactory to the State Board of Health, for a comprehensive sewerage system, including purification works.

REPORT ON PROPOSED SEWERAGE FOR DISTRICT NO. 4,
CANTON.

On August 16th, 1911, there was received from Mr. P. H. Weber, city engineer of Canton, plans for proposed sewerage in District No. 4, Canton. These plans were referred to the engineering department; and based upon information obtained from Mr. Hartzell, local member of the State Board of Health, and the chief engineer, during a recent inspection of Canton sewerage conditions, the following report was submitted:

The city of Canton, the population of which according to the last census is 50,217, has a fairly complete sewerage system, built upon the separate plan. In the the year 1907, there were 68.5 miles of sanitary sewers and 15.6 miles of storm sewers. It is probable that at the present time the former figure has increased to about 80 miles, and it is estimated that 70 per cent. of the population or 35,000 people are actually tributary to the sewers. In addition, there are several industrial establishments, including breweries, soap works, agricultural implement factories, and tinplate mills which contribute manufactural wastes as well as sewage to the sewers.

The main sewer conveys the sewage to purification works located just within the southerly corporation line, two miles from the center of the city. These works are designed on the chemical precipitation principle and were built in 1893. They are described in detail in the Board's special report of 1908 on "Water and Sewage Purification in Ohio." As may be seen from reading this description, the plant has been badly outgrown for several years past. The tributary population has increased from less than 10,000 to 35,000; and the average daily flow has increased from 800,000 to 2,500,000 gallons. The necessity for the enlargement of the plant has been well understood by the city officials; but owing to lack of desire to spend money for such a purpose, nothing has been done in regard to making the needed improvements.

For several years past the city has neglected to use chemicals in the treatment of the sewage, but has operated the tanks simply as settling basins and pumped the sludge on to nearby land. This method of operation has resulted not only in pollution of the stream, but also in creating a nuisance in the neighborhood. On account of law suits, brought by persons injured by the nuisance, the court has recently ordered the city to use henceforth a prescribed daily amount of chemicals. The city has apparently obeyed the instructions of the court and the odors of the plant have been reduced, although it is questionable whether the pollution of the stream has been materially lessened.

In November, 1910, plans for a new sewage purification plant to include septic tanks and sprinkling filters were submitted to the State

Board of Health for approval. These plans were considered by the Board on December 2nd, and it was voted to approve the general method of purification, but to withhold approval of the plan to build a new plant on the old site. The director of public service was advised that a new site of greater area, farther removed from the city, should be obtained. During the recent inspection by Mr. Hartzell and the chief engineer, it was learned that definite steps had already been made toward procuring such a site.

Proposed Plans for Additional Sewerage. It is now proposed to construct a system of sewerage in District No. 4, so called, which covers an area of something over one-half square mile, in the extreme southwestern corner of the corporation. The present population of this district is estimated to be about 2,000, which, on account of the nearby factories in the district, will probably increase to 8,000 or 10,000 within a few years. The sewers are to be built of vitrified pipe and are to be used for domestic purposes only. The following table gives the length and sizes:

31,724 feet of 8-inch pipe.
4,500 feet of 10-inch pipe.
1,360 feet of 15-inch pipe.
3,043 feet of 18-inch pipe.
2,532 feet of 20-inch pipe.
665 feet of 14-inch cast iron pipe for inverted siphon.
Total..... 8.4 miles.

The main sewer from the district, 20 inches in diameter, will extend from the corner of Bolivar Road and Market Street to the sewage disposal plant, a distance of about one-half mile, passing under Nimishillen Creek by means of the 14-inch inverted siphon.

CONCLUSIONS.

Although the additional sewerage for District No. 4 is doubtless needed, yet the district is at the present time not greatly overcrowded, there being not more than six persons to each acre. On the other hand, the Canton sewage purification plant has been overworked for several years past and has been a source of complaint, not only as regards odors from the plant itself, but also on account of the pollution of the stream into which the imperfectly purified sewage is discharged.

Giving due weight to the importance of providing sewerage for District No. 4, and also to the importance of properly disposing of the sewage of the 35,000 persons who are tributary to the disposal plant, it would seem that the latter problem should first be solved.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health considered the plans for proposed sewerage for District No. 4, Canton,

submitted by Mr. P. H. Weber, city engineer, on August 16th, 1911; and they were disapproved until such time as the city had commenced the construction of a new sewage purification plant to be located on a site satisfactory to the State Board of Health

REQUEST FOR RECONSIDERATION.

On November 9th, 1911, a communication was received from Mr. Ray F. Harbert, director of public service at Canton, requesting reconsideration by the Board, of its action of September 14th, disapproving proposed sewerage for District No. 4, at that city.

The following reasons were given by the director:

"A new sewage purification plant cannot be built without a popular bond issue, and it is feared that this bond issue cannot be carried unless the votes of the electors of District No. 4 are secured; and it is thought that unless sewerage facilities are provided for this district prior to the bond election, the electors of District No. 4 will oppose the bond issue." It was therefore thought by Mr. Harbert that the construction of the sewers in District No. 4 should be begun before the agitation for a new sewage purification plant is started.

At a meeting of the State Board of Health, held November 21st, 1911, this request that the Board's former action, disapproving plans for proposed sewerage for District No. 4, Canton, be reconsidered, and that the city of Canton be permitted to install sewers in District No. 4 at the same time that sewage purification works are being built, was taken up and the matter was referred to the engineering committee for further investigation and report.

REPORT ON PROPOSED SITE FOR SEWAGE PURIFICATION FOR CANTON.

On October 7th, 1911, there was received from Mr. Ray F. Harbert, director of public service of Canton, a plan showing the proposed site for the new sewage disposal plant which the city intends to install. This site had been inspected on July 26th, 1911, by Mr. Hartzell and the chief engineer, and on October 4th, 1911, by the assistant engineer. The following report was submitted:

The site proposed is located about five miles south of the center of the city of Canton and three miles south of the present sewage purification plant. The tract comprises about 21 acres, 17 of which are on the easterly bank of Nimishillen Creek, between the creek and the highway; while the remaining 4 acres adjoin the creek on the west. The tract is about one-half mile long with an average width of 350 feet, including the creek bed.

Although there are two or three farm houses near the boundaries of the proposed site, the country in general is very sparsely settled; and in view of the comparatively large amount of land which it is proposed to purchase, it will be possible to design and locate the plant so that no conditions objectionable to any residents in the vicinity need be created.

While a portion of the site is somewhat low, it all could be used for sewage purification purposes if dikes were constructed.

ACTION OF THE BOARD.

At a meeting held October 18th, 1911, the State Board of Health approved this site for a purification plant located about five miles south of the center of the city and three miles south of the present sewage purification plant.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR CHARDON.

On January 25th, 1911, there were submitted by Mr. B. F. Hewit, of Geneva, consulting engineer for Chardon, plans for a sewerage system and sewage purification plant for that village. In anticipation of these plans being submitted, one of the assistant engineers visited Chardon on September 20th, 1910, and inspected the territory involved. Furthermore, in 1906 the question of sewage purification for the village was investigated by the engineering department. The plans were referred to the engineering department and the following report was submitted:

The village of Chardon, the county seat of Geauga County, has a population of about 1500. The village is a residential community and contains no manufacturing industries of importance. At present the village has neither sewerage nor public water supply. Plans for the latter, however, are being prepared, and plans for sewerage and sewage purification have been completed and are herewith discussed.

The sewerage plans provide for sewers ranging in size from 8 inches to 12 inches in diameter, and having a total length of six or seven miles. The sewerage system is designed for an ultimate flow of 500,000 gallons per day, although it is not expected that there will be produced for several years to come more than 75,000 gallons, representing the sewage of the entire present population at 50 gallons per capita. On account of the excellent natural drainage of the village, very little ground water is expected to enter the sewers. No storm sewers or cellar drains are to be connected. The sewers will be ventilated by means of pipes extending above the roofs of the houses, and there will be no traps between the main soil pipes and the sewers. Two main trunk sewers, 12 inches and 10 inches in diameter, respectively, terminate on a tract of land adjacent to the Pittsburg, Painesville and Fairport Railway at a point

about 1,000 feet south of Claridon Road. The amount of land to be purchased by the city is not indicated by the plans. The nearest house is about 1,000 feet distant, and there are a few within one-half mile. The site, therefore, is satisfactory.

The system of purification is to consist of a screen chamber, sedimentation tank, and sand filters. The final effluent will discharge into a county ditch, the water of which ultimately finds its way into Bass Lake which is on the watershed of the Chagrin River. The volume of flow, however, is probably very small, so that the sewage must be well purified in order to protect the stream.

The screen chamber, an integral part of the sedimentation tank, is 3 feet by 8 feet and contains two parallel screens having an open space of $\frac{3}{4}$ inch. The design is satisfactory.

The sedimentation tanks are each 40 feet long and about 7 feet deep. One of them is $12\frac{1}{2}$ feet wide and the other $6\frac{1}{2}$ feet wide, thus giving capacities of 24,000 gallons and 12,000 gallons, respectively. Based on a nominal capacity of the plant of 75,000 gallons per day, the total sedimentation period afforded would be twelve hours. The tanks are all of substantial concrete construction, including reinforced concrete roofs. Provision is made for draining the sludge from each tank from two different points and conveying it through 8-inch cast iron pipes on to a specially prepared sludge bed.

The dosing tank, which is included in the same structure as the sedimentation tanks, is 20 feet square and is also covered. This tank has a capacity of 12,000 gallons, which is sufficient to flood one filter at each dose to a depth of 2 inches. The dosing tank will be discharged by means of automatic devices of a type manufactured by either the Pacific Flush Tank Company or Merritt & Company.

The sand filters are to be four in number, each 116 feet square, making a total area of one acre. They are to be enclosed by earthen embankments and are to contain 3 feet of lake sand overlying a 6-inch layer of gravel. In the center of the group of four filters is to be located the siphon chamber containing the automatic devices. From this chamber the sewage will be distributed over the surface of the sand through wooden distributing troughs, each having six outlets. The filters will be amply underdrained by 6-inch tile pipe to 10 feet on centers.

The rate of filtration proposed is 75,000 gallons per acre per day, or 1,500 persons per acre. As there will probably not be more than 1,000 persons tributary to the sewers for some years to come, the area proposed is liberal.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health approved the plans and specifications for sewerage and sewage purification for the village of Chardon, as submitted by Mr. B. F. Hewit, consulting engineer, on January 25th, 1911, provided:

1st. That the village purchase at least five acres of the ground as a site for the purification plant, in order to provide for future extension and to control the use of the land immediately adjoining the plant.

2nd. That samples of all grades of filtering material be submitted to and receive the approval of the State Board of Health before being placed.

3rd. That detailed plans for dosing apparatus be submitted to and receive the approval of the State Board of Health before being installed; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

The attention of the consulting engineer was called to the desirability of using only one grade instead of two grades of sand in addition to the gravel in the filters; and also to the fact that although the site for the sewage purification plant was under present conditions satisfactory, yet if this site were used, the new water works and wells should not be located nearby, as suggested by the plans submitted.

REPORT ON PROPOSED SEWERAGE AND SEWAGE DISPOSAL FOR KENSINGTON ADDITION, COLUMBUS.

On October 27, 1911, plans were submitted by Mr. A. Elliott Kimberly, of Columbus, consulting engineer for the Federal Realty and Improvement Company, for proposed sewerage and sewage disposal for the Kensington Addition to the city of Columbus. Previous to the receipt of these plans, one of the engineering assistants visited Kensington on October 14, 1911, to investigate a complaint of a resident of Mifflin Township, relative to the proposed sewer outlet into Alum Creek from the Kensington sewer. The following report was submitted:

Kensington Addition is located $4\frac{1}{2}$ miles northeast of the center of the city of Columbus and lies immediately south of the Johnstown Pike, a short distance east of Alum Creek. The addition comprises about 10 acres and is sub-divided into 150 building lots, which represents the number of residences which may ultimately be constructed. At present there are but two residences on the addition. In order to make the building sites more desirable, it is proposed to construct a sewer for sanitary purposes.

At the time of the inspection on October 14th, it was found that a 10-inch sewer had been partly built and the outlet established into Alum Creek. Following this inspection the following communication was sent to the Realty Company:

MR. W. DUNHAM, "Columbus, Ohio, October 16, 1911.
Care Federal Realty & Improvement Company,
1017 Columbus Savings & Trust Bldg.,
Columbus, Ohio.

Dear Sir:—It has come to our attention that there is being installed in the Kensington Addition, so-called, a sewer which will be the basis for a system to serve a number of houses.

I beg to call your attention to section 1240 of the Ohio Laws, which makes necessary the approval by the State Board of Health of your proposed scheme. We would suggest, therefore, that you stop all construction work, at least at the lower end of the sewer, until plans for some system of sewage purification have been submitted to and received the approval of the State Board of Health."

Signed: JAMES E. BAUMAN,
Chief Clerk.

As a result of the above communication, the company engaged the services of an engineer to prepare plans for proper disposal of the sewage.

Proposed Sewerage. The sewage, which will be of domestic origin, will be carried in a single, 10-inch vitrified sewer, which will ultimately become the basis for a complete system. This sewer will be about 1,000 feet in length, and will be constructed without manholes or flush tanks. It is the intention to construct a watertight cesspool for each dwelling and to conduct the overflow into the sewer. But this method it is hoped to avoid sewer clogging and consequent sewer nuisance, which would result were the unsettled sewage allowed to enter the sewer. The absence of a water supply prevents sewer flushing. During the next year the number of connections to the sewer will probably not exceed 20, while the ultimate number which may be expected within five or six years will not exceed 150. The total population which may ultimately become tributary to the sewer is estimated at 600. Cistern overflows are also to be connected with the sewer.

Proposed Sewage Disposal. The disposal system will comprise a dosing tank; distributing manhole; and a system of sub-soil absorption tile. The overflow from the cesspools and cisterns will be conducted through the 10-inch sewer to the dosing chamber. This is of concrete construction, is 5 feet square in plan, and has a capacity of about 475 gallons. It is entirely underground and is accessible for inspection and cleaning by means of a manhole. The sewage will be discharged from the dosing chamber into a distributing manhole, from which it will flow into the absorption tile. This manhole is of concrete construction, is placed in excavation, and is covered with a 2-inch plank cover. Its depth being 2 feet and its capacity 135 gallons or about one-fourth that of the dosing tank, there is some possibility of overflow taking place at the siphon discharge. The absorption tile consists of three lines of 4-inch tile with open joints, extending radially from the distributing manhole at angles of 30 degrees. These sub-surface tile are placed at an average depth of 6 feet below the surface of the ground in material which

consists of coarse sand and gravel sufficiently porous to readily absorb the sewage.

In order to provide for extremely high sewage flow, caused by continued rainfall occurring when the cisterns are full, there is to be placed an overflow from the dosing chamber which will conduct the excess, beyond that which the siphon will carry, to Alum Creek directly. This overflow is placed at an elevation slightly above the siphon overflow and should operate only when the storm flow is excessive. At such times the overflow will be very dilute and will cause no nuisance in the stream.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the Board considered the plans for proposed sewage disposal for the Kensington Addition to the city of Columbus, submitted by Mr. A. Elliott Kimberly, consulting engineer, on October 27th, 1911.

These plans were approved upon the following conditions:

1st. That the disposal system be enlarged if at any time, in the opinion of the State Board of Health, such enlargement becomes necessary;

2nd. That no direct closet connections to the sewer be permitted;

3rd. That the overflow from the dosing tank into Alum Creek be used only during extreme storm flow; and,

4th. That this approval be void unless construction shall have been begun prior to May 1st, 1912.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR COSHOCTON.

On February 25th, 1911, the city engineer of Coshocton, together with a member of council, called at the engineering department and exhibited a plan for sewerage the southeastern portion of the city. A report on this plan was submitted as follows:

Coshocton is a city having a population of about 9,600 and is a rapidly growing community with a number of important industries. At the present time sewerage is accessible to about two-thirds of the population. The sewers discharge into the Tuscarawas River or the Muskingum River at several points. None of the outlets were ever submitted to the State Board of Health for approval, although it is not known how many have been installed since the passage of the law which gave the State Board of Health jurisdiction over these questions.

There is at present in the southeastern portion of the city an area of about 200 acres that is entirely without sewers and is badly in need of them. About a year ago the question of providing sewerage for this

district was locally discussed, and on request of the president of council, the acting chief engineer of the Board made an inspection of the territory involved and informally presented his views to the council, stating that council should first retain a consulting engineer to make careful investigation and definite plans for sewerage of the district under consideration, and that the plans and information thus obtained should be submitted to the State Board of Health for its action. These informal recommendations were not entirely followed, but the city engineer was directed to prepare the plan which is now presented. This plan is quite general in its nature, but nevertheless sufficient for the Board to take action on with reference to solving the vital question as to whether or not more sewage should be allowed to enter the Muskingum River; and furthermore, the local officials state that they are very desirous of having the question settled definitely at this time in order that they may plan accordingly.

The proposed plan provides for sewerage of the area of 200 acres above mentioned, which at present contains a population of about 1,000, by means of a 12-inch main sewer with suitable laterals. The main sewer is to connect with a short line of 8-inch sewer said to have been constructed in 1897 (without the approval of the State Board of Health), which sewer discharges into the Muskingum River, through the existing main sewer.

In approving or disapproving the project, consideration should be given to the following points:

(1) Whether the discharge of sewage into the Muskingum River is consistent with good sanitation.

(2) Whether the proposition of connecting the southeastern district with an existing sewer and outlet brings the matter within the jurisdiction of the State Board of Health, as the present law provides that "no city, village, public institution, corporation or person, shall provide or install for public use, a water supply or sewerage system * * * * until plans therefor have been submitted to and received the approval of the state board of health."

(3) What influence, if any, should the fact that the short line of existing 8-inch sewer, which it is proposed to use as an outlet sewer for the new district and which was constructed fourteen years ago, have upon the consideration of the present problem.

Taking up the first feature of the problem, that of the general propriety of discharging city sewage into the Muskingum River, there should be mentioned first that the city of Zanesville, about thirty miles downstream, derives its water supply from the Muskingum River and will undoubtedly have to depend on this stream in the future. While the city of Coshocton is by no means the only source of pollution of the river above Zanesville, yet it is one of the chief contributors of sewage; and although the dilution afforded by the flow of the river is usually large,

yet it is by no means unreasonable to believe, based on our information of the transmission of typhoid and other intestinal bacteria, that the discharge of sewage at Coshocton does or may have a distinct detrimental effect on the quality of the water at Zanesville.

As regards the possible gross pollution and the causation of odors in the river immediately below Coshocton on account of the discharge of the city sewage therein, it may be said that with a properly constructed outlet and possibly with rough screening of the sewage, in general there would probably be little cause for complaint; although during an extreme low stage of the river it is questionable whether or not the flow would be sufficient to eliminate all visible effects of the sewage.

It might be mentioned at this point that the city of New Philadelphia, located on the Tuscarawas River about thirty miles above Coshocton, has, after careful investigation, been ordered by the State Board of Health, under the Bense Act, to purify its sewage in order to prevent local nuisance as well as with a view to keeping the river as pure as possible for water supply purposes. On the other hand, however, the Muskingum River below Coshocton has a greater flow than the Tuscarawas River below New Philadelphia.

Taking up the second feature of the problem, as to whether the proposed improvement constitutes a sewerage system, it may be said that the proposed sewers constitute a system so far as the southeastern portion of the city is concerned, although they do not by any means constitute a system as regards the entire city.

Taking up the third feature, as to the influence which should be given to the failure on the part of the city fourteen years ago to submit to the Board for its approval plans of the existing 8-inch sewer, it is believed that no weight one way or the other need be given to this. The present law, quoted above, is broader than the law that existed between 1892 and 1908 in that it refers to sewerage systems and not to sewer outlets, and hence would seem to give the State Board of Health jurisdiction in this case whether or not the outlet was previously approved.

CONCLUSIONS.

In view of the detrimental influence which the discharge of sewage at Coshocton would have on the quality of the water supply of Zanesville, the city should not be permitted to discharge more sewage into the river by constructing a sewerage system for the southeastern district.

This report was considered by the State Board of Health at a meeting held March 2nd, 1911, and the matter was referred to a special committee consisting of Dr. H. T. Sutton, member, and Mr. R. Winthrop Pratt, chief engineer, for further investigation and report.

This special committee reported as follows:

A description of the proposed project is contained in the foregoing report of the chief engineer.

Already the city of Coshocton contains about fifteen miles of combined sewers, to which some 7,000 people are said to be tributary. Inspection by the committee of the principal sewer outlet tends to corroborate this statement.

In considering the propriety of allowing any additional unpurified sewage to be discharged into the Muskingum River, it is first deemed desirable to present, in accordance with the suggestions of the engineering committee, some data regarding the flow of the Muskingum River.

The Muskingum River is formed at Coshocton, a point a few hundred feet above the main sewer outlet, by the confluence of the Tuscarawas and Walhonding rivers. The following table gives the watershed area of the above two rivers and this tributaries.

TABLE NO. 1.

Watershed Area.

	Square Miles.
Walhonding River	
Killbuck Creek	608
Mohican River	
Black Fork	580
Jerome Fork	324
Minor tributaries	67
Kokosing River	473
Minor tributaries	167
Total	2,219
Tuscarawas River	
Big Stillwater Creek.....	472
Sugar Creek	356
One Leg Creek.....	260
Sandy Creek	
Nimishillen Creek	170
Minor tributaries.....	288
Minor tributaries	944
Total	2,490
Total	4,709

From the above table it will be noted that the total drainage area of the Muskingum River above the sewer outlet at Coshocton is 4,709 square miles.

Table No. 2 gives the rainfall and run-off records for the three dry months of the years 1888 to 1895 inclusive, obtained from the report of Capt. H. M. Chittenden, U. S. A., on the Ohio Canal survey, which afford an estimate of the percentage run-off. This table is based on rainfall records near the upper part of the watershed, i. e., at Akron, Canton, Newcomerstown, and Wooster.

TABLE NO. 2.
Rainfall and Run-off.

	1888			1889			1890		
	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off
August	5.84	.669	11.4	1.98	.244	11.3	5.35	.485	9.1
September	3.28	.609	18.6	4.17	.137	3.3	6.86	2.279	33.1
October	3.25	.768	23.6	2.35	.136	5.8	6.20	2.014	32.4
Average	4.12	.682	17.9	2.83	.166	6.8	6.14	1.592	24.9
	1891			1892			1893		
	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off
August	2.08	.345	16.6	4.05	.604	14.9	2.31	.163	7.1
September	1.08	.172	15.9	2.33	.282	12.1	1.56	.142	9.1
October	1.25	.258	20.6	.80	.196	24.5	5.51	.464	8.4
Average	1.47	.258	17.8	2.39	.360	17.2	3.13	.256	8.2
	1894			1895					
	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off	Rain-fall	Run-off	Per cent Run-off
August .....	.67	.109	16.3	3.75	.110	2.9			
September	4.12	.151	3.7	2.39	.131	5.5			
October	2.19	.098	4.5	1.38	.084	6.1			
Average	2.33	.119	8.2	2.50	.108	4.7			

Table No. 3 gives the average yearly run-off for these years.

TABLE NO. 3.
Percentage of Run-off for Entire Year.

	1888	1889	1890	1891	1892	1893	1894	1895
	24.2	22.5	45.5	40.8	32.3	38.2	28.5	16.5

During the above period, the average flow of the Muskingum River at Coshocton is estimated to be 1748 cubic feet per second, which is of course much greater than the minimum flow.

Taking the minimum rainfall obtained during the three consecutive driest months in 1908 (which was a dry year), at Wooster, Canal Dover, Killbuck, and Bangorville, which total average rainfall was 3.04 inches, and considering furthermore the minimum percentage run-off for the

driest three months' period discussed in Chittenden's report, which was five per cent., the flow at Coshocton is found to be 209 cubic feet per second.

Furthermore, in the 1899 report of the Ohio State Board of Health, the engineer reports the flow of the Muskingum River at Eagleport below Zanesville to be 171 cubic feet per second for three consecutive driest months. Proportioning the Coshocton drainage area to that above Eagleport, the flow at Coshocton on this basis would be only 116 cubic feet per second.

In the 1904 report of the State Board of Health, page 151, it is noted by the engineer that the flow of the Muskingum River at Zanesville is at times as low as 150 cubic feet per second. This estimate was probably obtained by consultation with the local U. S. engineer at Zanesville. On this basis the flow at Coshocton would be only 120 cubic feet per second.

Regarding the time required for the sewage of Coshocton to reach the water supply of Zanesville, it is probable that during dry weather, on account of the backwater from the dams at Zanesville and at Dresden, this period would be 45 days or more. This figure is arrived at by considering the average velocity of flow in the lower and upper basins as 0.03 and 0.05 foot per second, respectively, and computing the velocity between the basins by Kutter's formula on the basis of the slope being $2\frac{1}{2}$ feet per mile, which is the average fall between Coshocton and Zanesville. In this connection it might be mentioned that the storage effect of the two dams would have a beneficial effect in purifying the water.

During freshets, when the influence of the dams is very much less, the average velocity of flow is estimated at two miles an hour, in which case pollution at Coshocton would arrive at the Zanesville water supply intake in less than 15 hours.

As discussed in the report of the chief engineer, the dilution of the sewage is such that, with a properly constructed outlet, or with possibly rough screening of the sewage, there would be no gross pollution (i. e., any pollution that could be detected by the sense of smell or sight) caused by discharging the sewage of Coshocton into the Muskingum River. The lowest estimated minimum flow of 116 cubic feet per second should be sufficient to satisfactorily dilute the sewage of 25,000 to 30,000 people, on the basis that a flow of four cubic feet per second is required for each 1,000 persons discharging sewage into a stream; whereas the present population of Coshocton is only 10,000.

The most serious objection to the discharge of the sewage of Coshocton into the Muskingum River relates to its influence on the present water supply of Zanesville. As discussed above, when the river is in flood and the velocity of flow is great, the pollution from Coshocton can probably reach Zanesville within ten hours. Furthermore, at such

times also the accumulated filth which is bound to occur in the bed of a river below a sewer outlet, would also be washed down. While the dilution afforded at these times would be very great, nevertheless there appears to be no available evidence to show that such dilution would eliminate typhoid and other dangerous intestinal bacteria. Furthermore, at medium stages of the river, when the dilution is much less, it is possible that the sewage may pass to Zanesville within two or three days. In view of the above facts, therefore, it is believed that Zanesville is entitled to protection of her water supply.

Health records for the last five available years, 1905 to 1909 inclusive, show that the average number of deaths from typhoid fever at Coshocton has been 5.4 per year, which probably represents about fifty cases per year. It is probable that they are always one or two cases in the city which may tend to infect the sewage.

As to the improvement of, or change in, the water supply of Zanesville, this is a question which has been under discussion for several years, and little actual progress has been made toward accomplishing any definite results. Assuming, however, that Zanesville must at some future time be obliged to use the river water filtered, even though for the immediate future it abandon the river, it seems reasonable that the river water should so far as possible be protected in order not to impose any undue load on such filtration plant.

ACTION OF THE BOARD.

This report was presented to the State Board of Health at a meeting held March 18th, 1911, and action was postponed until the next meeting, April 21st, 1911, when the plan submitted by Mr. A. M. Fisher, city engineer, February 25th, 1911, for sewerage of the southeastern portion of the city of Coshocton, with outlet into the Muskingum River was approved upon the condition that plans for a sewage disposal plant be submitted to the State Board of Health within the next eighteen months.

REPORT ON PROPOSED SEWERAGE FOR THE NORTH SIDE SEWER DISTRICT, COVINGTON.

On January 16th, 1911, there was received from Mr. W. H. Holfinger, secretary of The North Side Sewer Company of Covington, a request for permission from the State Board of Health to construct sanitary sewers and discharge same into the Stillwater River through the central sewer district outlet. This request was referred to the engineering department and an inspection was made on January 20th by one of the engineering assistants. On February 9th, profiles of the proposed sewers were received. The following report was submitted by the chief engineer:

The village of Covington, with a population of 1,848 according to the 1910 census, is located in the northwestern part of Miami County on the Stillwater River near its junction with Greenville Creek. The village is essentially a farming community and has no manufacturing industries. In the way of municipal improvements, the village has a public water supply derived from five driven wells located in the low land lying west of the Stillwater River, and several sanitary sewers. The topography of the village and surrounding country is undulating to hilly.

Covington is divided into three sewer districts, namely, the south, the central, and the north. Each district is sewered by a private company comprised of residents of the district, and not by the village as a whole.

Sewerage for the south district was approved by the State Board of Health June 7, 1909, with the following conditions:

"1st. That sewage purification works of a design satisfactory to the State Board of Health be installed and placed in operation at the end of a period of three years from date of approval.

2nd. That the main sewer be of such a grade that it can be easily continued to a proper site for sewage purification works in the future.

3rd. That suitable manholes be installed at all changes of grade and direction, and that in no case shall there be a greater distance than 400 feet between manholes.

4th. That this approval be void after June 1, 1911, unless construction of the sewers is commenced before that date."

This sewer was constructed in 1909 and consists of 1100 feet of 8-inch vitrified pipe with two 6-inch laterals, each about 500 feet long. The main sewer discharges into the Stillwater River near midstream, 50 feet south of Bridge Street. Previous to July 15, 1910, there were but five connections with this system.

The central district sewer, which serves the business portion of the village, was approved by the State Board of Health June 10, 1906, subject to the following conditions:

"1st. That definite plans and specifications be submitted later for approval by this Board and that these plans and specifications provide that the outlet be located at such a point that the sewage, from the entire village can, when necessary, be drained to it;

2nd. That this outlet be located at least 150 feet below the emergency intake of the village water works;

3rd. That the main sewer be of such a grade that it can be easily continued to a proper site for a sewage purification works in the future; and,

4th. That sewage purification works, of a design satisfactory to the State Board of Health, be installed and placed in operation whenever this is deemed necessary by said Board."

This sewer was constructed in 1906. The main sewer is of 10-inch vitrified pipe terminating in several lengths of cast iron pipe with leaded joints and discharging into the river about 100 feet below the emergency

intake of the water works. However, rapids in the stream between the point of discharge and the water works, prevent any contamination of the latter by the sewage. At present there are about 50 persons using this system.

It is now desired and proposed by The North Side Sewer Company to construct a sanitary sewer beginning at a point 300 feet east of the C. H. & D. Railway on Piqua Avenue and extending west in the same street across High Street as far as a small tributary of the Stillwater River, from which point it is to extend in a southerly direction about 500 feet and intercept the central sewer outlet, also described, 100 feet below the emergency intake of the water works.

The main sewer for the proposed new subsystems is to be 8-inch vitrified pipe 2400 feet long. It is expected that about 40 persons will be connected with this sewer when it is completed, and that the ultimate number will not exceed 500. It is proposed to connect cellar drains.

The additional amount of sewage which it is proposed to discharge into the Stillwater River through the central sewer district outlet will not materially increase the noticeable pollution of the stream for the present, and probably no nuisance will result at the point of outlet for several years. The constantly increasing quantity of sewage discharged at the outlet will, however, ultimately necessitate some provision for its proper disposal. This will require the construction of an intercepting sewer to bring the sewage of the entire village to one outlet, and the construction of a purification plant. Plans for these projects should provide for all future sewerage improvements of the village.

ACTION OF THE BOARD

At a meeting held March 2nd, 1911, the State Board of Health referred the question of sewerage for the North Side Sewer District at Covington to a committee consisting of Mr. Hill and the chief engineer for further investigation and report.

March 21st, 1911, Mr. W. H. Holfinger, secretary of the North Side Sewer Company, requested permission to construct a system of sewers for the north portion of the village, to discharge the sewage therefrom into the Central Sewer District outlet, as shown on profiles submitted February 9th, 1911.

ACTION OF THE BOARD.

The question was referred to the Board by mail and, upon the recommendation of Mr. Hill, the request was granted March 30th, 1911.

The Board advised that the village have prepared by a competent engineer, plans for an intercepting sewer and sewage purification works for the entire village, these plans to be approved by the State Board of Health for installation at some future date.

REPORT ON PROPOSED STORM SEWER FOR CROTON.

On October 31st, 1911, a communication was received from Dr. C. B. Hempsted, health officer of Croton, stating that a partial system of storm water sewers was in course of construction in the village, and requesting an investigation by the State Board of Health. On November 8th, 1911, one of the engineering assistants visited Croton and made an examination on the ground. During his visit plans and specifications for the sewer were obtained from the consulting engineer, Mr. H. L. Maddocks. The following report was submitted:

Croton, a village of about 400 population, is located in the northwestern part of Licking County on the watershed of the Licking River. The village is a small agricultural center and has no municipal improvements nor industries of importance. The topography of the village and of the surrounding country is rolling. The drainage from the village enters a small wet weather stream which originates a short distance northwest of the village and flows through the northeastern portion.

At present there are three storm drains in the village which have been constructed at various times without the approval of the State Board of Health. All are misused to some extent, receiving wastes of a putrescible character. Recently plans have been made to pave the streets surrounding the public square and to construct storm water sewers to drain this portion of the village. While the drainage of storm water is to be the primary function of the sewer, it appears to be the intention also to discharge sewage from dwellings into the sewer.

Proposed Storm Sewer. At the time of the inspection on November 8th, it was found that the sewer was almost entirely completed, although no plans had been submitted to the State Board of Health for approval. The plans obtained from the consulting engineer on November 8th, provide for the construction of sewers with a total length of about 1500 feet, constructed of vitrified pipe 4 inches to 12 inches in diameter with cemented joints, and provided with manholes at changes of grade and direction. These manholes are constructed with the bottoms below the invert of the sewer which will prevent a smooth flow of the sewage and will bring about the retention of sediment. The seriousness of this should domestic sewage be received by the sewer is apparent. Eight catch basins and one inlet are provided for storm water removal, while house connections are made possible by the placing of 4-inch Y branches opposite each lot in accordance with the provisions of the specifications. These Y branches indicate the use for which the sewer is intended.

The sewer as constructed surrounds the public square and extends north on Main Street some 400 feet where its outlet is located in a small run which crosses the street at this point. This stream which has its origin in a railroad drainage ditch just northwest of the village has

a small flow and is dry during a portion of the year. The point of outlet is about 200 feet from the nearest dwelling within the village and below the outlet the stream passes in close proximity to a number of dwellings. Needless to say the discharge of wastes of a putrescible character at the outlet established, would result in a decided nuisance. If the sewer is used for storm water removal only the point of outlet is satisfactory.

ACTION OF THE BOARD.

At a meeting held December 20th, 1911, the State Board of Health approved the plans of a storm water sewer for Croton, already constructed, submitted November 8th, 1911, by Mr. Maddocks, consulting engineer, upon the following conditions:

1st. That the village council immediately pass and file with the State Board of Health an ordinance, prohibiting the discharge of domestic wastes, cesspool overflow, or other putrescible wastes into the sewer, and providing for the removal of any existing connections discharging such wastes into the sewers. This proposed ordinance to be first submitted to the State Board of Health and receive its approval as meeting the provisions of this condition;

2nd. That there be appointed a village official whose duty it shall be to regulate the use of the sewer in accordance with the provisions of the ordinance governing the same; and,

3rd. That before any connection is made to this sewer, for any purpose whatsoever, such connection shall receive the approval of the Secretary of the State Board of Health; and it shall be the duty of the village official provided for in Condition 2 to see that this condition is complied with.

REPORT ON SEWERAGE CONDITIONS AT CUYAHOGA FALLS.

On June 20th, 1911, there was received from Messrs. Rogers and Rowley, attorneys for Henry Reinstorff of Cuyahoga Falls, a complaint regarding the discharge of sewage into a watercourse passing through the premises of their client; and, furthermore, calling attention to the fact that a new sewer was being constructed to discharge directly into the Cuyahoga River in such a manner as to cause further damage to their client.

In response to this communication, representatives of the engineering department visited Cuyahoga Falls on June 26th and August 28th, 1911, respectively; and based on information obtained during these visits the following report was made:

Cuyahoga Falls is located on the Cuyahoga River about five miles north of Akron. The population at present is about 4,000. The Cuya-

hoga River passes through the center of the village in a narrow gorge, the bottom of which is at most points 100 feet or more below the level of the residential and business districts. There are two dams across the river within the corporation limits.

In 1903 there were prepared by the village and approved by the State Board of Health, plans for a comprehensive system of sewerage. These plans, however, have never been carried out.

In May, 1906, the village requested approval of a change in the plans, whereby the sewage could be discharged through five different outlets instead of but one, as originally contemplated; but the State Board of Health disapproved this proposed change.

In October, 1906, the State Board of Health considered the application for a change in the location of the main outlet, whereby the same was to be placed somewhat above the original location but below the lowest dam in the village.

Since October 1906, the Board has made no investigation of the conditions at Cuyahoga Falls until the recent complaint. It now appears that several sewers have been constructed by the village, or by persons or groups of persons, without the approval of the State Board of Health; and that these discharge into the river at convenient points without regard to the question of future collection and disposal of the sewage. With the exception of two, the sewers all discharge into the river above the dams.

It is learned that several more sewers are contemplated and one, the north side sewer, so called, is about completed, although no house connections have as yet been made. This sewer is constructed of 12-inch vitrified pipe and will accommodate some fifteen houses in the northerly portion of the village. Although the discharge of sewage from this particular sewer may not, in itself, cause a serious nuisance, yet when considered in connection with the present ten or twelve illegally constructed sewers, as well as in connection with the contemplated sewers, it will be seen that the village is fast being sewerred in an unsatisfactory and haphazard manner and in violation of the law which makes necessary the approval of plans for such sewers by the State Board of Health.

CONCLUSIONS.

It is suggested that the State Board of Health take some action relative to preventing the use of the north side sewer, which is nearly completed; and, if possible, cause either the abandonment of the existing illegally built sewers, or the combining of same into a general system with one outlet below the village, so located that purification works can be readily built. It is believed that the sewage of Cuyahoga Falls should be purified as soon as the city of Akron installs its purification works, plans for which are about to be formulated,

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health voted to require the village of Cuyahoga Falls to prepare plans for the systematic construction of sanitary sewers, or the interception of sewage from the present sewers with a view to collecting all of the village sewage at one point and there purify it when necessary.

The Board also voted to prohibit the use of the North Side sewer recently constructed, as well as all other illegally installed sewers unless the sewage from such sewers be intercepted in accordance with the plan suggested above.

On December 1st, 1911, a communication was received from Mr. D. F. Felmly of Akron, legal adviser for the village of Cuyahoga Falls, asking reconsideration of the Board's action of September 14th, 1911. The communication was referred to the engineering department and the following statement made:

The failure to carry out the plans approved in 1903 has been due principally to the failure to secure the passage of a popular bond issue, and partly to laxity on the part of the village officials. A number of sewers have been constructed since 1903, by the village or by private enterprise, not in accordance with the approved plans, but in a haphazard way without the approval of the State Board of Health. By this unwarranted procedure, about eight outlets into the Cuyahoga River have been established. Furthermore, it has been learned that several new sewers are now contemplated.

In view of the construction of sewers, without conformity to the approved plans, which has taken place in the past and which is contemplated for the future, it is believed that the village should not be allowed to continue the present conditions, but should take immediate steps to correct them, as required by the Board in its action of September 14th, 1911.

ACTION OF THE BOARD.

At a meeting held December 20th, 1911, the State Board of Health considered the request made December 1st by Mr. D. F. Felmly, legal adviser for Cuyahoga Falls, and voted to confirm its action of September 14th, 1911.

REPORT ON PROPOSED SEWER AT DEFIANCE.

About June 15th, 1910, it was learned by the engineering department that the city of Defiance was engaged in the construction of a sewer in Fourth Street, approval of which had not been requested of the State Board of Health. A communication was sent to the director of public

service through the Secretary's office, requesting complete plans for the same. On June 23, 1910, an answer was received from Mr. Charles Behringer, director of public service, in which it was stated that the failure on the part of the city officials to submit plans and request approval of the sewer had been due to their ignorance of the law requiring such action. It was also stated that the sewer had been practically completed. On June 23rd, 1910, one of the assistant engineers visited Defiance for the purpose of making an investigation on the ground. The following report was submitted:

Defiance, the county seat of Defiance County, is located at the confluence of the Maumee and Auglaize rivers. Its present population is in the neighborhood of 8,000. The sewerage has been constructed generally on the combined plan. The sewers have been built as needed and follow no definite plan, but consist of single lines emptying through independent outlets into the Maumee or Auglaize rivers at the most convenient points.

In general the sewers have been built too small to accommodate the combined flow of storm and sanitary sewage and at times much trouble is experienced from the flooding of the sewers.

There are at present about seventeen sewer outlets, nine of which discharge into the Maumee River, the other eight discharging into the Auglaize River.

While the discharge of sewage from the existing sewers does not create a nuisance in either the Auglaize or Maumee River, yet with the growth of the city it has an increasing deleterious effect upon the water supply of the village of Napoleon, which is located on the Maumee River at a point sixteen miles below Defiance. Napoleon now draws its water supply directly from the river, which at this point is unquestionably polluted, and a part of this pollution is due to the sewage of Defiance. The water supply of Napoleon should, of course, be purified, but even in this case no undue burden should be placed upon the purification works by the discharge of large quantities of sewage from Defiance.

The Wayne Street and Jefferson Street sewers having outlets into the Maumee River, a short distance above the confluence with the Auglaize River, have caused serious trouble owing to the small size of the sewers, and it was therefore decided to construct a trunk sewer from Wayne Street to the Auglaize River to receive the sewage flow from the Wayne Street and Jefferson Street sewers and divert it from the old outlet discharging the flow into the Auglaize river. That portion of the Wayne Street and Jefferson Street sewers north of the Fourth Street trunk sewer will continue to discharge through the old outlets.

The trunk sewer in Fourth Street, approval for which was not requested, has been entirely constructed and is now receiving the sewage flow from the Wayne Street and Jefferson Street sewers. It has a total

length of 1,000 feet, consisting of 15-inch and 22-inch vitrified pipe laid with cemented joints. Its outlet is located at the east end of Fourth Street on the west side of the Auglaize River. The top of the pipe at the outlet was placed at a depth of about one foot below the low water level of the river at the edge of the bank of the stream. The presence of a dam in the Maumee River, a short distance below the city, will keep the outlet at all times submerged. The channel of the stream near its banks at this point is several feet deep, but its current is rather slow. It is not thought that any local nuisance will be caused due to the establishment of this outlet.

At a meeting of the State Board of Health held June 29th, 1910, this report was submitted, definite action was postponed and the report referred back to the engineering department for further information in regard to the dam across the Maumee River below Defiance and the possible effect of this dam on the water supply of Napoleon.

More information was therefore obtained on the ground and from the State Board of Public Works, and the following supplementary report was made:

The dam under construction is located across the Maumee River about four miles below Defiance. It was constructed for the purpose of making navigable a portion of the river, and further, for diverting the river water into that portion of the Miami and Erie Canal which begins just above the dam and from there extends to Toledo.

The dam is straight in plan, rectangular in cross section, and is of heavy timber construction. It is approximately 280 feet long by 7 feet wide on top, and is 12 feet high. It is founded on bed rock and is provided with an apron 9 feet long extending from a few inches below the top at an angle of 40 degrees with the horizontal. The ends of the dam are joined by means of heavy masonry to the banks of the river.

Owing to incomplete data, it was found impossible to estimate the storage of the reservoir formed by the dam. The flow of the river, however, has been the subject of investigations for two or three years (from 1903 to 1905) by the U. S. Geological Survey, under the immediate supervision of the present chief engineer of the State Board of Health. Discharge data gathered at that time indicate that the extreme minimum flow of the river below Defiance is more than 200 cubic feet per second, while the usual dry weather flow is much greater than this. As this quantity is more than could be conveniently passed through the Miami and Erie Canal, it is apparent that there must be at all times some water passing over the dam unless the leakage through it is very great. Testimony from local residents, however, indicates that the dam is fairly tight, and that there is always a current passing the crest.

Referring to the relation between the discharge of sewage from Defiance and the water supply of Napoleon, which is taken from the Maumee River some sixteen miles below, the following conclusions may be drawn.

1. That it is impossible at any time to divert the entire flow of the river through the canal and thus by-pass the Napoleon intake.

2. That the dam four miles below Defiance forms a settling basin and storage reservoir, which would tend to have a beneficial effect in purifying the Defiance sewage before it reaches Napoleon, both by sedimentation and by retarding the time of passage of the infected matter and dangerous bacteria to the Napoleon intake.

On the other hand, the discharge of unpurified sewage into the river by the city of Defiance offers a menace to the Napoleon water supply. According to proper modern sanitary practice, the Defiance as well as the Napoleon water, should be purified. This, however, would mean an extensive remodeling of the sewerage system of Defiance, and it does not seem reasonable to attempt to enforce this at least before Napoleon does its part in purifying its water supply, because Defiance does not comprise the only possible source of pollution of such supply.

Furthermore, the proposed outlet under discussion at Defiance, which has already been constructed and is in use, is in the nature of a relief sewer outlet and will not, for the present, be the means of discharging into the river any appreciable additional amount of sewage.

ACTION OF THE BOARD.

This report was considered by the State Board of Health, at a meeting held January 25th, 1911, and the Board voted to approve the trunk sewer recently constructed in Fourth Street for the purpose of receiving the sewage from existing sewers in Wayne Street and Jefferson Street, and to notify the authorities of Defiance that the Board might at any time require the city to intercept and treat the sewage before discharging it into the river, though this was not demanded at that time.

REPORT ON PROPOSED NEW SEWAGE PURIFICATION PLANT FOR DELAWARE.

Plans for a proposed new sewage purification plant for Delaware were received on February 23rd, 1911, from The Riggs and Sherman Company of Toledo, consulting engineers. The plans were referred to the engineering department and the following report was submitted:

Delaware, which has a present population of about 9,000, is located on the Olentangy River some twenty-five miles above Columbus. The city, as well known, is chiefly residential in character, it being the seat

of the Ohio Wesleyan University, and with the exception of the Big Four railroad shops contains no large industrial plants.

The public water supply was installed in 1889, the same being derived from driven wells located along the river several miles below the city.

Existing Sewerage and Sewage Purification Plant. Prior to 1902 there was no system of sewers which could properly be so called, but beginning in that year there has been built a fairly complete system of sanitary sewers comprising some thirteen miles of vitrified pipe sewer ranging from 8 inches to 24 inches in diameter. At the present time it is estimated that about 5,000 people are tributary to the sewers. Observations have shown that the flow of sewage averages about 500,000 gallons per day, this high figure being caused by the entrance into the sewers, through leaky joints, of considerable amounts of ground water.

Analyses of the sewage made three years ago during the special investigation of the Board into the operation of the existing sewage purification plants of the state, confirmed the above statement and showed that the sewage was so dilute that the free oxygen was not taken up by the organic matter, and furthermore, that the greater part of the putrescible components were in suspension. In other words, the sewage as examined at the outlet of the main sewer was found to be fresh and dilute.

At about the same time that the improved sewerage system was installed, there was also constructed a sewage purification plant consisting of septic tanks and contact filters. The plant was located on a 12-acre tract of land situated between the Pennsylvania Railroad and the river, about one-half mile south of the edge of the city. This tract of land is very low, and consequently it was necessary to surround the plant by a high dike. This protection, however, after a few years proved to be inadequate in preventing damage to the plant by every freshet. For this cause, and also seemingly by reason of indifference on the part of the local authorities, the plant has been more and more neglected each year until at the present time it is practically useless.

Proposed Plans. Owing to the inefficiency of the present sewage purification plant and the consequent discharge into the Olentangy River of unpurified sewage, there have been made several complaints against the city; and furthermore, the State Board of Health has from time to time urged the city officials to take steps toward remodeling the existing sewage purification plant or building a new one. The plans now submitted are in compliance with the latter recommendation, it being thought advisable by the consulting engineers to locate a new plant on higher ground, even at the cost of pumping the sewage, rather than to attempt to secure permanently satisfactory operation on the low ground which formed the site for the old plant.

The new plant will be of the same general type, that is, settling tanks and contact filters, as the old one. It is designed to take care of the sewage of at least 6,000 people at 100 gallons per capita per day, and with the liberal rates used as a basis of design, it is believed that the plant will be large enough for some years to come; and when it has reached its capacity, it can be readily enlarged without abandoning any part of the present proposed installation.

The entire sanitary sewage flow of the city is to be diverted from the present main sewer at a point about 300 feet northeast of the corner of Henry and Hayes streets, from which point a 24-inch vitrified pipe sewer will pass southward through Walnut Street and discharge into a pump well at the edge of the tract of land which is to comprise the disposal site. The new disposal site will be bounded on the south by the Olentangy River and on the west by the Pennsylvania Railroad, and the plant itself will be over 1,000 feet from the nearest house and about three-fourths mile from the edge of what may be termed the built up portion of the city. With the type of plant proposed, it is believed that the proposed site will be satisfactory.

Just before passing into the pump well, the sewage is to be screened through two screens, one having an open space of $1\frac{1}{4}$ inch and the other an open space of $\frac{3}{4}$ inch. The pump well is a circular structure 30 feet in diameter, built of brick walls and covered with a concrete roof. Over one side of it is placed a small brick building containing an electric motor driving through beveled gearing a vertical centrifugal pump located 4 feet above the bottom of the pump well. Automatic electrical devices will start the pump when the sewage reaches a predetermined level in the pump well, and will stop the pump when the well has been emptied.

An 8-inch force main leading from the pump well passes into a distributing chamber at the upper end of the settling tanks. These tanks are three in number, each 15 feet wide, 100 feet long, 6 feet deep on the sides and 8 feet deep in the middle. They will have a total capacity of 250,000 gallons or at least ten hours flow, though a much less period of retention may be secured if desired. These tanks are to be of reinforced concrete and will be uncovered. Baffles are to be placed every 15 feet throughout the length of the tanks. Passing through the center of each tank longitudinally is a rectangular sludge trough 12 inches wide, which has a grade of about four per cent. These troughs connect at their lowest points through sluice gates with 12-inch iron pipes leading to the sludge bed.

The area of contact filters is laid out in the form of a 300-foot semi-circle with automatic controlling devices in the center of the circle. The effluent from the settling tanks will pass to these controlling devices, and from thence be distributed to the filters. These devices being patented, it is impossible under the Ohio law to specify any special

make, but the type will be determined later after taking bids. In any case, the function of the automatic apparatus will be to divert the flow on to one of the four filters while a second filter is standing full, a third filter is draining, and the fourth filter is resting.

As will be inferred from the above, each filter is in the form of a sector of a circle having a 150-foot radius, the central angle being 45 degrees. The total area thus provided is 0.8 acre. The depth of filtering material will be five feet. The tributary population per acre-foot, therefore, will be at present but 1,000, and this will not increase to much above 1,200 for several years. The present installation in this respect is therefore ample.

The filtering material will be composed of crushed stone graded from three inches in size at the bottom to one inch at the top. The sewage is to be distributed from the control chamber, which will be covered by a suitable house, through galvanized iron carriers; and the underdrains leading back into the control chamber, will be rectangular troughs depressed below the bottom of the filter.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health considered the plans for a new sewage purification plant for the city of Delaware, as shown on drawings submitted by The Riggs and Sherman Company of Toledo, consulting engineers, on February 23rd, 1911.

These plans were approved provided:

- 1st. That detailed plans of the automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed.
- 2nd. That at least ten acres of ground be purchased as a site for the purification plant.
- 3rd. That samples of the filtering materials to be used be submitted to and receive the approval of the State Board of Health; and,
- 4th. That this approval be void unless construction of the plant is begun before January 1st, 1913.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR THE GREENE COUNTY CHILDREN'S HOME, XENIA.

On March 20th, 1911, plans and specifications were submitted by Mr. A. Elliott Kimberly, of Columbus, consulting engineer, for sewerage and sewage purification for the Greene County Children's Home near Xenia. The plans and specifications were referred to the engineering department and were reported on as follows:

The Greene County Children's Home located near Xenia is now under construction. The population of the institution when finished will be about sixty, and may in the future be increased to seventy-five. The institution will be provided with a water supply and with modern plumbing.

It is proposed to collect the sewage in a combined manhole and flush tank located about 30 feet in front of the building, from which it will be automatically discharged, in comparatively small doses, through a 5-inch vitrified pipe sewer 600 feet long, terminating at the purification plant on the side of the hill southwest of the institution. The purified sewage will drain into a small tributary of the Little Miami River.

The method of purification consists of screening, sedimentation, and intermittent sand filtration. The sewage first passes through a screen chamber containing a screen with a $3\frac{1}{4}$ -inch open space, and then passes into the sedimentation tank which is 4 feet by 7 feet by 6 feet, holding about 1600 gallons. Based on the expected flow of 2500 gallons, this tank will retain the sewage for seventeen hours.

The sewage overflows from the sedimentation tank through a single 6-inch pipe into the dosing tank, which holds 1,000 gallons or a quantity sufficient to flood one of the sand filters to a depth of about 2 inches at each dose. The dosing tank is to be discharged by two automatic siphons acting alternately and each connected with one of the sand filters.

The sand filters are two in number, each 33 feet square and having a combined area of 0.05 acre. The rate of filtration based on the nominal capacity of the plant, will be 45,000 gallons per acre per day or 1,200 persons per acre period. Suitable provision has been made for distributing the sewage over the sand and for collecting the filtered sewage. The specifications provide for using an excellent quality of sand.

The plans as presented provide for a sewage purification plant of ample capacity and suitable design for the Greene County Children's Home and one that will produce a well purified effluent.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held April 21st, 1911, these plans for sewerage and sewage purification for the Greene County Children's Home, shown on drawings and described in specifications submitted by Mr. A. Elliott Kimberly, consulting engineer, March 20th, 1911, were approved upon the conditions:

- 1st. That the filtering materials employed be submitted to the chief engineer of the State Board of Health for approval before use, and if in his judgment "fine or coarse coke" will answer the purpose better than the "sand" specified, that the same with "due discretion" be substituted for sand; and,

- 2nd. That this approval be void unless construction is begun before January 1st, 1913.

REPORT ON PROPOSED STORM WATER SEWER FOR GIBSONBURG.

On May 15th, 1911, there was received from Mr. William J. Mead, attorney for Gibsonburg, a plan for a storm water sewer for that village. This plan was referred to the engineering department and an inspection made on May 23rd, 1911. The following report was submitted:

Gibsonburg, having a population of about 1,900, is located in Sandusky County on the watershed of Portage River. The topography of the village and surrounding country is very flat, and drainage is effected by county ditches. The village has a public water supply derived from deep wells.

At present there are four storm water drains in the eastern part of the village, and one in the southern part. All of these drains discharge into county ditches. They receive more or less domestic sewage, although no nuisance from this source has yet been complained of.

It is now proposed to construct about 4,500 feet of vitrified storm sewer, ranging from 8 to 12 inches in diameter. The ditch into which this sewer will discharge has but a slight fall and has little, if any, dry weather flow. Furthermore, it is badly obstructed, owing in part to refuse from a planing mill some 500 feet north of the proposed outlet. While the proposed sewer is called a storm sewer and its main object is to carry off surface drainage, yet it is also intended to discharge into it the overflow from a cesspool at the school house on Gibson Street. The discharge of the school house sewage would not only in itself cause objectionable conditions, but would in addition very likely serve as a precedent for other domestic sewer connections. The use of the proposed sewer for anything except surface drainage should, therefore, be disapproved.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health approved the proposed storm water sewer for Gibsonburg (with the understanding that it is to receive storm water only), as shown on a plan submitted May 15th, 1911, by Mr. William J. Mead, attorney for the village, provided:

- 1st. That the ditch at the proposed outlet be thoroughly cleaned.
- 2nd. That council pass an ordinance prohibiting the use of the proposed sewer for cesspool overflows, cellar drainage, sink wastes, or domestic sewage of any kind; and that a certified copy of this ordinance be filed with the State Board of Health before construction of the sewer is commenced,

REPORT ON PROPOSED STORM SEWERS FOR HILLIARDS.

On July 24th, 1911, there was received from Mr. H. C. Gowdown, village solicitor, a plan for storm sewers for Hilliards prepared by Mr. E. E. Legg, C. E., of Columbus. The plan was referred to the engineering department and based upon an examination of the plan and knowledge of local conditions previously secured during a visit to Hilliards by the assistant engineer, the following report was submitted:

Hilliards is a village of 370 population, located in the western part of Franklin County $8\frac{1}{2}$ miles northwest of the city of Columbus. It is essentially a farming community and contains no manufacturing industries. Thus far the village has made no public improvements. The topography of the village and the surrounding country is flat and drainage is inadequate. The surface water is carried off in county ditches and eventually reaches the Scioto River through a small tributary which enters the Columbus water works storage reservoir.

Owing to the very poor drainage facilities, the construction of storm water sewers to remove the surface water as well as the subsoil water, has been demanded for a number of years; although on account of the absence of a public water supply, sanitary sewers are not at present required and but a small amount of domestic sewage is at present produced within the village. The local officials state, therefore, that it is their intention in providing the present installation of sewers, to secure means for the removal of storm water and subsoil drainage only.

The engineer for the village has prepared a plan and estimates for a somewhat comprehensive system of storm sewers. The cost has been estimated to be \$8,000 and bonds for this amount have already been voted by the people. The plan in general provides for the placing of sewers in two existing ditches which pass in a general northeasterly direction through the village; and the construction of laterals of 8-inch, 10-inch, and 12-inch vitrified sewer pipe leading into the sewered ditches. Catch basins are to be located at convenient points for the removal of surface water.

All of the sewers are to be placed at sufficient depth to provide for cellar drainage, and this is perhaps the most desired advantage to be secured from the use of the sewers. The placing of the sewers at this depth, however, makes it possible to use them for sanitary sewage, especially with the installation of cellar drains, which enter the interior of the cellars and which may receive various classes of domestic wastes. To prevent the possible misuse of the village sewers in this way, it is necessary that there be strict regulations preventing the installation of any direct connection to the sewers. The drainage of cellars should take place by means of drain tile laid around the outside line of the house foundations.

As the outlet of the proposed system will be into an open ditch, which leads to the small tributary of the Scioto River before referred to, it will readily be seen that the contamination of this ditch by any sewage from Hilliards would endanger the water supply of the city of Columbus. It is, therefore, apparent that all waste of a dangerous character should be excluded from the proposed sewers and only storm water and subsoil drainage admitted thereto.

ACTION OF THE BOARD.

At a meeting held August 10th, 1911, the State Board of Health approved the plan for a proposed storm water sewerage system for Hilliards, as shown on drawing prepared by Mr. E. E. Legg, consulting engineer, of Columbus, and submitted by Mr. H. C. Gowdown, village solicitor, on July 24th, 1911, provided:

1st. That the village council pass an ordinance prohibiting the installation of any pipe or drain for the purpose of connecting the interior of any house or cellar with any of the village sewers; and that a certified copy of this ordinance be filed with the State Board of Health before the letting of any contracts for the construction of the proposed sewers; and,

2nd. That this approval be void unless construction of the proposed sewerage system is begun before January 1st, 1913.

(Ordinance passed September 11th and filed with State Board of Health September 14th, 1911.)

REPORT ON PROPOSED SEWAGE DISPOSAL PLANT FOR CLEVELAND BOYS' FARM, LOCATED AT HUDSON.

On August 12th, 1911, there were received from Robert Hoffmann, chief engineer of the department of public service, Cleveland, plans for a sewage disposal plant for the Cleveland Boys' Farm, located at Hudson. These plans were referred to the engineering department, and an inspection of the proposed sewage disposal site was made by one of its representatives. The following report was submitted:

The Cleveland Boys' Farm, a public institution owned by the city of Cleveland, is located about 2.5 miles northwest of Hudson. The farm covers an area of 25 acres and contains six cottages or dormitories, besides a gymnasium, school house, carpenter shop, bakery, and a number of farm buildings. Most of the buildings are new.

The sewage, exclusive of storm water or roof water, will be collected in an 8-inch vitrified tile pipe and conveyed to the disposal site in the southerly portion of the farm, about 400 feet from the nearest cottage. This cottage is at present occupied by only a few laborers.

The site chosen borders a county ditch, which flows into Brandywine Creek (also known as Mud Creek). Brandywine Creek passes through uninhabited, swampy land for 14.5 miles, and finally enters the Cuyahoga River below Akron. Along the course of the stream there are two lakes.

The population of the institution is at present 160, and it is not expected that it will ever exceed 250. The plant is designed on a basis of 40 gallons per capita for the ultimate population, thus making a total sewage flow of 10,000 gallons per day.

The sewage on arriving at the disposal plant is first screened through two coarse iron screens, composed of parallel rods. It then enters the sedimentation tank, which is 6.5 feet from inlet to outlet, 9 feet wide and 5 feet deep. The tank is divided into two compartments, one 3 feet wide, and one 6 feet wide; so that the sedimentation period may be varied as desired. At the bottom of each compartment is an outlet, controlled by a 6-inch gate leading to a nearby sludge bed. The tank will have a maximum capacity of 2,000 gallons or about five hours' flow.

The settled sewage overflows from the tanks into a trough, through which it passes to the dosing tank, which is built adjacent to the sedimentation tank. The dosing tank is 17 feet 9 inches by 9 feet, with a maximum depth of 2 feet. This will provide a dose of 2,200 gallons, sufficient to flood one of the sand filters to a depth of about 3 inches.

The sand filters, which are located adjacent to the sedimentation tank, are four in number and rectangular in shape, each 35 by 40, thus giving a total area of about one-eighth acre. Based on the nominal capacity of the plant, this area corresponds to a daily rate of 80,000 gallons per acre, or a population of about 2,000 per acre.

Each filter is underdrained by 6 and 4-inch sewer pipe, laid with open joints, in depressions in the bottom of the filters, and surrounded by gravel. On top of the gravel will be 3 feet of sand or other fine material of approved quality. The sludge bed is 18 feet square and is to contain 1 foot 3 inches of sand.

The plant is designed according to approved standards, and offers no untried features. While the proposed maximum rate of filtration of 80,000 gallons per acre per day is quite conservative, yet, on account of the strength of the sewage (i. e., high tributary population per acre), the filters will probably not need to be cleaned frequently when the ultimate population becomes tributary thereto. Labor, however, at an institution of this kind is available in abundance. For the present population of 160, the plant is of generous size and the method is well adapted to the local conditions.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health approved the plans submitted August 12th, 1911, for a sewage disposal plant for the Cleveland Boys' Farm located at Hudson, provided:

1st. That all samples of filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being used; (Submitted September 7th, 1911, and approved September 15th, 1911.)

2nd. That detailed drawings of all dosing apparatus be filed with the State Board of Health as soon as same have been adopted; and,

3rd. That this approval be void unless the plant is completed on or before January 1st, 1913.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR KENNEDY HEIGHTS.

On March 30th, 1911, there was submitted by Mr. J. A. Stewart of Cincinnati, consulting engineer for Kennedy Heights, plans and specifications for a sewage purification plant for that village. In anticipation of these plans being submitted, Mr. John W. Hill, member of the Board, and the chief engineer visited Kennedy Heights November 23th, 1910, to inspect the proposed location for the plant, and held a preliminary conference with the consulting engineer regarding the most suitable method of purification under the local conditions. The above mentioned plans and specifications were referred to the engineering department and the following report was made:

Kennedy Heights is a residential village having a population of about 600, located some ten miles northeast of the center of the city of Cincinnati in the valley of a branch of Duck Creek. The topography is decidedly hilly.

The sewerage system is not yet constructed, but this work is about to begin. The main sewer will terminate at a tract of land 1.9 acres in area, in the sharp valley or ravine adjacent to the Cincinnati Northern Railroad and just south of the railroad station. This site, being much lower than the surrounding residential portion of the village, would afford a fairly inconspicuous place for sewage purification works, and no nuisance need be caused to the occupants of the nearest houses or the persons about the railroad station if the proposed plant is properly installed and carefully operated. On the other hand, however, the topography of the site will necessitate more expensive construction than if level ground were available, especially as the creek must be carried under the plant through a concrete culvert.

Based on the present population of 600, a sewage flow of 60,000 gallons per day may be expected; and the plant is designed with this figure as the nominal capacity.

The method of purification is to be screening, sedimentation, and treatment in two sets of contact filters.

The main 12-inch sewer from the village enters a circular manhole at the upper end of the disposal site, at which the sewage is diverted through two 8-inch pipes leading to the screen chamber. This manhole also affords opportunity for by-passing the sewage directly to the creek in case of emergency.

There are to be two double sets of screens placed in a shallow chamber at the upper end of the settling basins. The screens have an open space of $\frac{3}{8}$ -inch. The settling basins are two in number, each 41 feet wide and the average depth is 8.5 feet. A submerged baffle wall across the tanks, 14 feet from the outlet end, divides them into two compartments, and an 8-inch cast iron sludge drain connects with each compartment.

At the lower end of the settling basins and part of the same structure is the dosing tank or controlling chamber, which is 8 feet by 10 feet, with a maximum depth of 7 feet. The type of controlling apparatus has not yet been decided upon.

The primary contact filters are each 60 feet long by 18 feet wide and 4 feet deep, having a total area of 0.05 acre. This represents a rate of filtration of about 1,000,000 gallons per acre per day, four cycles per day, or 3,000 persons per acre foot. The filters are to be surrounded by reinforced concrete walls and will have concrete floors thoroughly underdrained. In fact, it is believed that more underdrains are used than are necessary for a contact filter.

The sewage is to be distributed by a system of 8-inch and 4-inch pipes laid just below the surface of the filtering material. By this method the sewage need never appear at the surface and there will be no opportunity for odors unless, through neglect, the filtering material is allowed to become foul.

For filtering material it is proposed to use cinders. The consulting engineer has not fully decided, however, on what size of cinders to use in the primary filters, and asks advice from the State Board of Health on this point.

The secondary filters are to be a duplicate of the primary filters, but will be placed at a lower level in order to receive the effluent from the former. The size of filtering material for the secondary filters should be smaller than that for the primary filters.

It will be noted that it is proposed to depart from the usual method of controlling contact beds. The sewage is to be intermittently dosed on to the filters instead of being allowed to flow on to one filter continuously until it is full and then be diverted to another. Under the local conditions it is believed that the proposed method will be satisfactory. The discharge of both secondary and primary filters will be controlled by automatic timed siphons.

It is believed that by the system proposed, the sewage of Kennedy Heights will be sufficiently purified to discharge into Duck Creek without creating objectional conditions, and furthermore, that with careful attention the plant can be operated in a satisfactory and inoffensive manner, even though it be fairly near to the railroad station and to some houses.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the plans for a sewage purification plant for Kennedy Heights, as shown on drawings and described in specifications submitted by Mr. J. A. Stewart, of Cincinnati, consulting engineer, on March 30th, 1911, were approved upon the following conditions:

- 1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;
 - 2nd. That detailed plans of all automatic controlling devices be submitted to and receive the approval of the State Board of Health before being installed; and,
 - 3rd. That this approval be void unless construction is begun before January 1st, 1913.
-

REPORT ON PROPOSED STORM WATER SEWER FOR LINDEN HEIGHTS.

On January 11, 1911, a communication was received from Mr. Ralph L. Cheney, attorney for the village of Linden Heights, requesting that the time designated by the State Board of Health for the construction of a system of sewers for that village be extended to May 1, 1912, and furthermore, that the village be permitted to tap into these sewers for sink drainage. The matter was referred to the engineering department, the territory was inspected by one of the engineering assistants, and the following report was submitted by the chief engineer:

The village of Linden Heights, having a population of about 1,000, is located some five miles from the center of the city of Columbus. It contains about 260 acres within the corporate limits.

Plans for a proposed storm water sewer system for the village were approved on April 22, 1909, with the following conditions:

"1st. That the village council pass and file with are State Board of Health an ordinance forbidding the tapping of all sewers shown on plans submitted and any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind.

2nd. That this approval be void after May 1, 1910, unless construction of the sewers is commenced before that date."

The above approved sewer system comprises six different subdivisions with a total of four outlets. The village now proposes to construct one of these sub-systems having an outlet into a small intermittent watercourse or ditch which passes through about three miles of farm country and discharges into Alum Creek near St. Mary's of the Springs. Request is also made for permission to connect with this sewer, sink drains as well as cellar drains.

Referring to the conditions of approval of the plans for the storm water sewer system, it will be noted that the time set for commencing construction is past. It should also be considered that council has failed to pass and file with the State Board of Health any ordinance forbidding the tapping of storm sewers for domestic purposes, and furthermore, now requests that this condition of approval be withdrawn and that the use of the system be allowed for sink drainage and cellar drainage, which would in effect be making it a combined system.

On account of the small size and location of the stream or ditch which is to receive the drainage of the village, it would be entirely out of the question, from a sanitary standpoint, to permit anything but storm drainage to be discharged therein.

ACTION OF THE BOARD.

At a meeting held January 25th, 1911, the State Board of Health considered the request made January 11th, 1911, by the village solicitor, Ralph L. Cheney, for an extension of the time for constructing a part of a proposed system of sewers for the village to May 1st, 1912, and also permission to tap into this sewer for sink drainage and voted to grant an extension of time for completing the sewer to May 1st, 1912, but to refuse permission to tap the sewer for sink drainage.

The attention of the authorities was called to the fact that the proposition to connect branch house sewers and cellar drains with the proposed storm water sewer which would be wholly dry, excepting the house sewage, for weeks and months at a time, is objectionable and unsanitary and is bound to be the cause of nuisance and offense to the people of the village.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR MAIN SEWER DISTRICT NO. 1, LUCAS COUNTY, NEAR TOLEDO.

On February 16th, 1911, there was received from the County Commissioners of Lucas County, conjointly with several owners of land located along the Maumee River a short distance southwest of the city of Toledo, a petition under Section 6596 of the general code of

Ohio, asking that the State Board of Health pass upon the necessity for a sanitary sewer in the above referred to district. At a meeting of the Board, held March 2nd, 1911, this petition was referred to a committee consisting of Dr. Oscar Hasencamp, member, and the chief engineer of the Board. This committee, being familiar with the territory involved, held a conference at Toledo, March 16th, with the city officials and with Mr. William H. Gould, representing the owners of a certain portion of the property above referred to.

The committee made a report, with recommendations, which was considered at a meeting held March 18th, and the Board (by virtue of its authority under Section 6596) resolved that a main sewer, for sanitary purposes was necessary in the district lying on the westerly side of the Maumee River from the southerly corporation line of the city of Toledo to a point at least one and one-half miles upstream from the city water works intake; and the secretary was instructed to notify the commissioners of said action in order that they might cause the necessary surveys and plans to be prepared.

At the August 10th meeting of the Board, Mr. Gould stated that since the action taken by the Board in March the legislature had passed a new act governing sewers outside of municipalities and requested that the Board take further action declaring this sewer, with disposal or purification works, necessary. Such action was then taken by the Board. (See August minutes.)

November 6th, 1911, Mr. Gould, county sanitary engineer for Lucas County, submitted plans for proposed sewerage and sewage purification for Main Sewer District No. 1 of that county. The plans were examined by the engineering department and the county engineer advised of certain defects in the design. December 15th, one of the engineers visited Toledo and accompanied by the consulting engineer inspected the district and the proposed location for the sewage purification plant. On this date revised plans were submitted.

At a meeting of the Board held December 20th, a report by the engineering department was considered and the plans submitted on November 6th and December 15th, were disapproved. While the general features of the purification works, including sedimentation and filtration through sand were deemed satisfactory, it was considered inadvisable to approve the plans as submitted on account of the proximity of the Toledo water works intake.

The commissioners were notified that the details of design would have to be revised to provide greater facility of operation to secure efficient purification at all times, and they were also advised that in a proposition of this sort the Board deemed it necessary and advisable to have the project carefully studied by an engineer of experience in the design and construction of sewage purification works.

On January 16th, 1912, revised plans for sewage purification plant were submitted by Mr. Gould, these plans having been prepared with the advice of Mr. R. Winthrop Pratt, consulting engineer.

The plans were reported upon by the engineering department as follows:

Main Sewer District No. 1, Lucas County, comprises a total area of 784.1 acres, located along the northeast bank of the Maumee River immediately southwest of the city of Toledo and just above the Toledo water works intake and purification plant. The district includes a number of suburban residence districts, which at the present time are not extensively built up, and also the Miami Children's Home. With the installation of sewerage facilities the future growth of the district will probably become quite active. The total present population is 300, including 220 inmates of the Children's Home. This population will be immediately tributary to the sewer and the county engineer estimates the ultimate population within ten years to become 1,000.

The proposed sewerage consists of a main sewer with a total length of 16,800 feet, constructed of vitrified pipe 15 inches in diameter. Future extension of the system will be made by the construction of laterals connecting to the main sewer. The main sewer follows a course opposite to the slope of the Maumee River, and the low point to the system is in the extreme southwesterly portion of the district, or that portion which is farthest up stream. Owing to the proximity of the Toledo water works intake, which is located 2.3 miles below the proposed outlet, it is necessary to include a purification plant in the design of the system.

Proposed Sewage Purification Works.

The plans submitted on January 16, 1912, provide for a plant designed for an ultimate population of 1,000, and a sewage flow of 60,000 gallons. The plans in general provide for septic tanks of the Emscher type, a sludge filter, a dosing tank, intermittent sand filters, and a disinfection plant.

Site. The location selected for the sewage purification works is satisfactory. The plant may be located at a distance of 600 feet from the nearest buildings which are occupied by the Miami Children's Home. No residences are in close proximity to the site, and its topography is such that the future encroachment of dwellings will probably not occur. A portion of the site is subject to submergence during flood conditions, but proper construction will insure safety for the purification works.

Septic Tanks. The tanks provided for the preliminary treatment of the sewage are patterned after the Imhoff tanks used in the Emscher district. The total depth of the tanks from the flow line to the bottom of the sludge compartment is 14 feet, which in a small installation is claimed to be sufficient by the consulting engineer. The tanks are

divided into two compartments by false bottoms so that the sewage flowing through the upper compartment is kept separate from the putrefying sludge below. The gases from the sludge compartment are deflected from the incoming sewage by a false bottom and leave the tank through openings along the sides. The tanks are placed in series and each has a capacity of 2,500 gallons. Either one or both tanks may be used, depending upon the sewage flow. The arrangement of the tanks makes possible the control of the period of flow from 1.6 hours to 2.6 hours. The sludge is removed by means of 6-inch pipes extending to the bottom of the sludge compartment, and will be conveyed to a sludge bed having an area of 100 square feet and a filtering material of 2 feet of sand. The effluent from the sludge bed will be conducted through the main effluent bed of the plant. No water pressure for stirring up the sludge to facilitate removal from the septic tanks is provided on the plans, although the consulting engineer states that a 2-inch water pipe will be installed.

Dosing Tank. The effluent from the septic tanks is to be conducted into a covered dosing tank before its application to the intermittent sand filters and provision is also made for by-passing the effluent directly with a continuous flow to the filters. This by-pass should be used only in case of necessity, owing to failure of the dosing apparatus. The dosing tank is divided into two compartments each of which may be operated independently, or both may be used at one time. The capacity of each compartment is 4,800 gallons, and the period of retention may be controlled between limits of 6.9 and 4.1 hours. Two alternating siphons are to be installed for applying the doses to the intermittent sand filters.

Filters. The intermittent sand filters, having a total area of one acre, are divided into eight units of one-eighth acre each. The filters are arranged in two rows of four units each, and are separated by concrete division walls. Each row of filters will be dosed by the discharge of one of the alternating siphons and hand operated gate valves are placed to regulate the units receiving the dose. The discharge from the dosing chamber will be distributed upon the sand by means of 6-inch cast iron pipes laid below the surface of the sand and discharging upward on circular concrete slabs at two points on each unit. It is apparent that a good distribution will thus be effected. The filtering material consists of 33 inches of sand resting upon gravel graded from coarse to fine. The underdrains are placed in valleys 9 inches deep by 22 feet wide and are covered with coarse gravel.

Disinfection Plant. The main drains from all of the filters are conducted to a small disinfection plant to provide for treatment of the sewage should such become necessary. Although the housing for the plant is to be constructed immediately, the apparatus will not be

installed until required. The effluents from all the units join in one main outlet from the disinfection plant through which it will be conducted to the Maumee River.

ACTION OF THE BOARD.

At the meeting held January 17th, 1912, this report was considered, and the plans prepared by Mr. Gould and submitted by Mr. R. Winthrop Pratt, consulting engineer, were approved provided:

- 1st. That samples of the filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health;
- 2nd. That the plant be completed before the proposed sewers are placed in use; and,
- 3rd. That the plant be operated at all times in a manner satisfactory to the State Board of Health.

REPORT OF PROPOSED STORM WATER SEWER FOR MIAMISBURG.

On June 19th, 1911, there was received from George W. Riley, engineer for Miamisburg, plans and specifications for a storm water sewer to be constructed in that village. These were referred to the engineering department and the following report was submitted:

The proposed plans contemplate the construction of a brick sewer, the greater portion being 72 inches in diameter, beginning near the corner of Mound Road and Smith Street, and extending westerly in Smith Street under the Ohio and Erie Canal to the Great Miami River. The sewer is designed to take the flow of a small creek in the southeasterly portion of the village as well as the storm water in Smith Street and other nearby streets, thus draining a total area of 1,500 acres. The total length of the sewer will be about 2,900 feet, and the cost will be \$17,000.

No provision is shown for house connections of any kind and the engineer specifically states that no domestic sewage or household wastes will be admitted therein.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the plans for a storm water sewer for the village of Miamisburg, as shown on drawings submitted by Mr. George W. Riley, engineer for the village, on June 19th, 1911, upon the following conditions:

- 1st. That before constructing the sewer, council pass and provide for the enforcement of an ordinance prohibiting the use of this

sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and, (Ordinance adopted August 2nd, 1911.)

2nd. That this approval be void unless construction is begun before January 1st, 1913.

Realizing the dangers arising from the use of storm water sewers for sanitary purposes, the Board called the attention of the authorities to the importance of carefully looking after the enforcement of their ordinance, which is to prevent the use of storm sewers for sanitary purposes.

REPORT ON PROPOSED SEWER FOR MUSKINGUM COUNTY CHILDREN'S HOME, NEAR ZANESVILLE.

On July 25th, 1911, there were received from D. Y. Geddes, engineer for the Muskingum County Children's Home, near Zanesville, plans for a sewer for that institution. In anticipation of these plans being submitted, as well as for the purpose of investigating a proposed water supply, the Home was visited on April 7th, 1911, by the chief engineer, and on May 17th, 1911, by one of the engineering assistants. The plans were referred to the engineering department and the following report was submitted:

The Muskingum County Children's Home is located near Jonathan Creek about six miles southwest of the center of Zanesville on the Crooksville and Zanesville Electric Railway. It is about half-way between Darlington and White Cottage on the Zanesville and Western railroad.

The institution, which consists of one large building, has just been completed and is ready for occupancy. It has a capacity for 60 or more children, besides the superintendent and attendants. The building is equipped with modern plumbing and will be supplied with water derived from a spring some distance away.

In order to dispose of the sewage, it is proposed to construct an 8-inch vitrified pipe sewer extending from the institution to Jonathan Creek at a point about 200 feet below the Zanesville and Western Railroad bridge.

Jonathan Creek at this point has, according to the records of the Geological Survey, a watershed of 189 miles, and a dry weather flow of about 20 cubic feet per second. It enters the Muskingum River at a point three miles further down stream, in the vicinity of South Zanesville.

While the discharge of sewage from the Children's Home would not grossly pollute the stream, nevertheless, during low water it might

cause objectionable deposits in the vicinity of the outlet and would be a menace to persons bathing or wading in the stream in that vicinity.

Viewing the matter from a broad standpoint, and in view of the fact that it is entirely feasible for the institution to dispose of its sewage in a sanitary manner by means of a properly constructed disposal plant, it would seem that the proposed sewer should not be allowed.

ACTION OF THE BOARD.

After consideration, these plans were disapproved by the State Board of Health at its meeting held August 10th, 1911, and the superintendent was advised that the directors of the Muskingum County Children's Home should cause to be prepared plans for a suitable sewage disposal plant, and submit the same to the State Board of Health for approval.

At the meeting of the State Board of Health held September 16th, 1911, Mr. W. V. Hollingsworth, county surveyor for Muskingum County, appeared before the Board and requested a reconsideration of its action of August 10th, disapproving the proposed sewer for the Muskingum County Children's Home.

The matter was reconsidered and a committee, consisting of Dr. H. T. Sutton, member, and the chief engineer, was appointed to make an investigation and report.

On September 14th, the committee held a conference at Zanesville with the county commissioners and reported as follows:

After learning through the committee that the cost of a sewage disposal plant would not be excessive, the commissioners offered no objection to installing one, although they desired to be given until spring to do so. This extension of time was asked for two reasons; first, because it was considered necessary to place the Home in use at once; and second, because sufficient funds for constructing the sewage plant would not be available until January 1st.

The county commissioners, therefore requested permission to dispose of the sewage until next spring, by discharging it into a large cesspool which has been constructed on the grounds of the institution. This cesspool was built by a local mason with the idea that it would be permanently adequate to dispose of the sewage, but later its use was disapproved by the officers of the Home who thought that a sewer should be built. The temporary use of this cesspool would not involve in any way the pollution of the creek, and it is believed that it would be adequate to dispose of the sewage for six months or so.

ACTION OF THE BOARD.

At the meeting held October 18th, 1911, the State Board of Health considered the request of the commissioners to dispose of the sewage by discharging it into the large existing cesspool on the grounds of the

Muskingum County Children's Home, and granted permission to use said cesspool until May 1st, 1912, and to require that plans for a suitable sewage purification plant be submitted to the Board for approval not later than February 1st, 1912.

REPORT ON PROPOSED CHANGES IN SEWERAGE SYSTEM AND PURIFICATION OF THE SEWAGE OF NEW BREMEN.

On April 18th, 1911, there were received from Mr. A. Elliott Kimberly, consulting engineer for the village of New Bremen, general plans showing proposed changes in the sewerage system and purification of the sewage of that village. These plans were referred to the engineering department and the following report was submitted:

New Bremen is in the southwestern part of Auglaize County on the extreme upper watershed of the St. Marys River and has a population of about 1,600. The Miami and Erie Canal passes through the village.

At present the village is provided with a public water supply derived from deep wells. There are four existing lines of sewers having a total length of four and one-half miles, which have been built during the last ten years and were intended for storm sewers. The usual practice, however, of making connections for domestic sewage, was begun soon after the installation of the sewers, with the result that at present there is a considerable amount of objectional sewage discharged into the ditch which passes through the village parallel to the canal. To avoid creating a nuisance, however, 3,000,000 gallons of canal water are daily diverted into the ditch.

In 1906 the State Board of Health approved plans for a new sewer to discharge into the ditch, with the following conditions:

"1st. That a continuous stream of 3,000,000 gallons of water per day be diverted from the Miami Canal (after making the necessary arrangements with the State Board of Public Works) and passed through the ditch, in order to dilute the sewage from the proposed sewer as well as from the present sewers.

"2nd. That sewage purification works, satisfactory to the State Board of Health, be installed and operated when this method of disposal by dilution becomes, in the opinion of said Board, inadequate.

3rd. That all catch-basins connected with the present and proposed sewers be trapped and that these catch-basins, as well as the sewers themselves, be flushed at regular intervals in order to prevent the accumulation of foul deposits in the sewers."

The plans submitted are very general in character so that it is not possible at present to report on more than the general method that is proposed for solving the local problem. It is intended to intercept

the dry weather flow of sewage in the existing Main and Franklin Street and in the Washington Street sewers. Said dry weather flow up to 100,000 gallons per day will be treated in two settling tanks having a total capacity of 50,000 gallons, and the effluent from these tanks will be disinfected with hypochlorite of lime.

In addition, it is proposed to continue the present practice of diverting from the canal into the ditch, at least 3,000,000 gallons of water daily. This will insure at all times a safe dilution of the settled sewage as far as the creation of a nuisance is concerned; and the action of the hypochlorite of lime, if properly handled, will insure bacterial purity and thus preserve the water in the ditch for stock watering purposes.

At a meeting of the State Board of Health held April 21st, 1911, the general plan for purifying the sewage of New Bremen was approved, said plan being:

(a) By intercepting the dry weather flow up to 100,000 gallons per day and treating the same in settling tanks having a total capacity of 50,000 gallons.

(b) By sterilizing the effluent from the settling tanks with hypochlorite of lime.

(c) By diverting from the canal into the ditch, for the purpose of diluting the settled sewage, 3,000,000 gallons of water daily.

The local authorities were informed that before final approval was given to the project, the Board would expect that full detailed plans for sewerage and sewage disposal improvements together with a description of the proposed method of applying the disinfectant, be submitted to and receive the approval of the State Board of Health.

In conformity with the approval given April 21st, 1911, Mr. A. Elliott Kimberly, submitted, May 22nd, 1911, detailed plans showing the proposed method for purifying the sewage of New Bremen. These were referred to the engineering department and the following report was made:

The plans now submitted represent a consistent elaboration of the general method already approved. The dry weather flow of sewage from the Main, Franklin and Washington Street sewers will be diverted into covered settling tanks located a short distance north of the corporation. The settling tanks are in duplicate, each being 56 feet long, 10 feet wide, and 7 feet average depth. The combined capacity is therefore about 50,000 gallons, affording a minimum of twelve hours sedimentation.

The settled sewage overflows into a rectangular basin 12 feet by 20 feet by 7 feet deep, which is designed to be used as a future pump well in case filters are ever installed. For the immediate future it will serve as a chamber in which the sterilizing agent will be mixed with the settled sewage before being discharged into the outlet ditch.

The plans show in new detail the design for a "chemic" house, in which bleaching powder is to be dissolved in tanks and applied

through regulating devices to the settled sewage. The solution tanks are two in number, 4 feet in diameter and about 4 feet high. They together will probably hold enough solution to last for twenty-four hours. The outlet of these tanks connects with the orifice box, in which a constant level is kept by means of a float valve and from which the sewage is discharged into piping leading to the mixing chamber.

As noted in the former report, there will be diverted from the canal into the ditch which is to receive the sewage, a daily flow of water of 3,000,000 gallons. The dilution thus afforded, together with the sedimentation and sterilization of the sewage, will doubtless provide a satisfactory solution of the local problem.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 1st, these detailed plans of settling tanks and sterilization apparatus for New Bremen were approved upon the following conditions:

1st. That the plant be operated at all times in a manner satisfactory to the State Board of Health;

2nd. That during the first thirty days of the operation of the sewage purification plant, the consulting engineer be placed in full charge of same and that he submit a report to the Secretary of the State Board of Health. This report shall show the necessary amounts of hypochlorites which are required to treat the sewage under various conditions, the time required for the action of the chemicals, and such other details as are necessary to show conclusively that the process will be satisfactory under local conditions;

3rd. That the village keep daily records, according to a form to be approved by the State Board of Health, governing all features relating to the operating of the plant and to the application of chemicals, and that such records be submitted weekly to the Secretary of the State Board of Health;

4th. That whenever conditions warrant the addition of a pumping plant and filters to the proposed installation, such addition be made; and,

5th. That this approval be void unless construction is begun before January 1st, 1913.

REPORT ON PROPOSED SEWERAGE FOR NEW PHILADELPHIA.

On December 6th, 1910, there was received from Mr. L. E. Chapin, consulting engineer for New Philadelphia, a copy of a report which he had recently completed relative to proposed sewerage

plans for that city. On December 12th, 1910, there was received from Mr. George E. Arnold, city engineer of New Philadelphia, a map of the proposed sewerage system signed by himself and by Mr. Chapin, consulting engineer. The report and plan were referred to the engineering department and the following report was made:

New Philadelphia is at the present time inadequately provided with sewers, only the central portion of the city being provided with sanitary drainage consisting of combined sewers of rather poor design which discharge into the Tuscarawas River near the foot of First Street. The outlets of these sewers have been the cause of much complaint in the past and have been condemned as a nuisance by the State Board of Health.

Résumé of Past Actions of the State Board of Health. On November 6th, 1907, the Board approved plans for a new sewerage system and sewage purification plant for New Philadelphia, prepared jointly by Mr. Paul R. Murray, of that city, and Mr. E. G. Bradbury, of Columbus subject to the following conditions:

"1st. That the sewage purification works be built before any of the new sewers are placed in use; and,

"2nd. That the operation and management of the plant be at all times satisfactory to the State Board of Health."

In January, 1908, request was made for approval of additional sewerage contemplating the use of one of the existing outlets near the foot of First Street and omitting the sewage purification plant. This plan was disapproved by the Board at a meeting held April 22nd, 1908, but permission was given at this time to omit for present installation eight of the sixteen sand filters contemplated in the approved plans. It was pointed out also that this permission did not change the past action of the Board in requiring the sewage purification plant to be installed before any of the proposed sewers were placed in use.

On April 6th, 1909, a petition was received from the local board of health asking the State Board of Health to take action, under the Bense Act, with reference to abolishing the outlets near the foot of First Street. A second petition signed by some 600 citizens and making the same request, was also received. On April 19th, 1909, the special committee appointed to investigate, consisting of Mr. Hartzell, member, and the chief engineer, submitted a report which showed that the outlets caused conditions detrimental to the health and comfort of people living near them, and recommended that construction of the sewage purification plant, already approved, be begun as soon as possible. The Board at a meeting held April 21st, 1909, acting upon the report of the committee, found that the above discussed outlets were detrimental to health and in accordance with procedure under the Bense Act, directed the Secretary to notify the local officials that

they would at the next meeting of the Board be given an opportunity to be heard and to show cause, if any, why they should not abate the nuisance complained of.

At the next meeting of the Board on June 16th, 1909, the city solicitor of New Philadelphia appeared before the Board and begged that no further action be taken under the Bense Act. It was voted that further proceedings under said act be postponed provided (a) that the present outlet near the foot of First Street be abandoned for house drainage and sewage; and (b) that the city proceed without further delay to install the sewers and sewage purification plant according to plans already approved.

On September 23rd, 1909, no action having been taken toward carrying out the above provisions relating to the abandonment of the existing outlet and the installation of a sewage purification plant, a communication was sent to the city solicitor stating that, if necessary to secure action, the Board would issue an order by authority of the Bense Act, requiring the city to undertake to complete the work within the specified time. At the next meeting, on October 14th, 1909, a communication was presented from the city solicitor in regard to permitting a change of site for the proposed sewage purification plant. The matter was referred to the acting chief engineer for investigation, and in accordance with his report the proposed change of site was approved at the meeting of the Board held January 20th, 1910.

At the Board meeting held April 20th, 1910, the city solicitor presented resolutions and a petition requesting permission to change the outlet and extend the sewer system, omitting the construction of the sewage purification plant at the present time. The Board after considering these resolutions and petition at said meeting, "voted not to allow postponement of the installation of a sewage purification plant, but to require the city of New Philadelphia to proceed with the building of such a plant in accordance with the former order of the State Board of Health."

Plan Now Proposed. Following the above, the council of New Philadelphia called in Mr. L. E. Chapin, consulting engineer, for the purpose if possible of modifying the sewerage plan previously adopted and devising some project whereby the city could proceed to build the sewers without beginning the construction of the sewage purification plant. Mr. Chapin accordingly has prepared the report and plan which are now before the Board for action. The report reviews the plans already adopted and refers to the previous actions of the State Board of Health insisting on sewage purification. The plan calls for changes in the location and sizes of some of the sewers proposed in the previously adopted plans, but no changes are to be made in the plans for sewage purification as prepared by Messrs. Murray and Bradbury and previously approved and adopted. Mr. Chapin now

proposes, as was also the case with the previous plans, to ultimately collect all of the sanitary sewage in a new system of sewers and to use the present combined sewers for storm water drains to discharge at the present outlets.

The estimated cost of the sewerage improvements and purification works, according to data now submitted, is \$140,759.05, of which \$38,940.65 would be assessed directly on the property and the remainder paid out of the city treasury.

It is stated that there are at the present time about 500 sanitary sewer connections, and that the dry weather flow of sewage is less than 300,000 gallons per day. With the completion of the new sewers proposed, it is estimated that there will be some 500 new connections and that the flow will be increased to 800,000 gallons. The report of the consulting engineer calls attention to the fact that under the present valuation in New Philadelphia, it would take three years for council to vote the necessary funds, without a vote of the people; and it is feared that a vote of the people would not result in provision for sewage purification, although this statement is not universally accepted locally.

The consulting engineer, therefore, proposes that the council agree to issue and sell bonds in such amount as is possible each year; to use the proceeds from the first of such bonds to pay for the needed storm water sewers and for the purchase of land for sewage disposal; and to use the bonds voted in the second and third years for the construction of the sewage disposal plant. He also recommends "that the State Board of Health on its part, under such agreement by you to issue such bonds, permit you to build the 'upland' sewerage system, and levy the assessments therefor, in the year 1911, with the result that the total sewage flow will not be materially increased, till the disposal plant is built.

"To do this it is only necessary to make such communication to the State Board of Health, so agreeing to build the disposal plant, and ask that the condition of the November 6th, 1907, approval, (which condition provides that the sewage purification works be built before any of the new sewers are placed in use) "be amended to provide for the construction of this part of the sewer system, and the disposal plant built in 1913."

Although no agreement on this subject has been received from council, it is clear that even if the members of the present council were unanimous in agreeing to provide for completing the purification plant by 1913, their present terms expire December 31st, 1911. They would therefore have no authority for making agreements of this character which would bind the actions of the future council.

The request for postponement of the date for installing a sewage purification plant, as now presented, is largely a repetition of the

request which has been made every year for the past three years and has been on each occasion refused by the State Board of Health. The present request, however, appears to be more definite in that it fixes a time for purifying the sewage. The fact, nevertheless, as explained above, that the present council cannot direct the actions of the future council, would make the agreement with the State Board of Health as proposed, of little or no value. There seems to be on the whole, therefore, no reason for considering the question from a different standpoint than that taken by the Board from time to time during the past three years.

The report of the consulting engineer indicates the feasibility to spend, during the coming year, the sum of \$39,000 for sanitary sewers (to be paid for by special assessment), and nearly \$35,000 (to be raised by the issuance of bonds) for general sewerage purposes. The last named sum would be nearly enough to construct the outfall sewer, buy land for sewage purification, and construct, according to approved plans, a purification plant having an area of five acres of sand filters. Such expenditure would cause no hardship for the residents of the upland district now desiring sewers, because the desired sewers, being paid for by special assessment, could be started immediately after the starting of the purification plant.

ACTION OF THE BOARD.

At a meeting held January 25th, 1911, the State Board of Health considered the general plan for proposed sewerage for New Philadelphia, prepared by George E. Arnold, city engineer, and L. E. Chapin, consulting engineer, submitted December 12th, 1910; and also considered the suggested procedure for constructing the work, outlined in the report of the consulting engineer, accompanying said plans.

The Board voted to disapprove the construction of sanitary sewers previous to the beginning of work upon the sewage disposal plant, and to require that contracts be made simultaneously for such additional sewers as may now be required, and for sewage disposal works.

At the March 2nd, 1911, meeting of the Board, Mr. Kuhns, city solicitor, requested action upon these plans, stating that the city was ready to make both of these improvements at the same time.

The plans submitted December 12th, 1910, were then approved.

REPORT ON PROPOSED SEWERAGE FOR PLEASANT HILL.

On October 20th, 1911, there was received from Mr. A. C. Reed, village engineer, a location plan for a proposed sewerage system for the village. On November 2nd, 1911, one of the engineering assistants visited Pleasant Hill, conferred with the village engineer, and

examined the proposed improvements. The following report was submitted:

Pleasant Hill, a village with a population of about 575, is located in the western portion of Miami County, on the Stillwater River, a tributary of the Great Miami River. The village is essentially a farming community and has no manufacturing industries. It is provided with a public water supply, installed in 1909. The water supply is used by about half of the population and owing to its good quality the demand for it is increasing. There is, therefore, a necessity for sewerage facilities, especially as the village is at present provided with no sewers of any kind. The proposed improvements are to be paid for by subscriptions of funds made by public-spirited citizens.

The site of the village is rather level, but the main portion is situated at an elevation of some 70 feet above the Stillwater River, which is about three-fourths mile west of the village. The valley of the stream ranges from one-half to three-fourths mile in width. In general it may be said that the topography yields itself well to the installation of a sewerage system. The geological formations within the village consist of a layer of drift, varying from 2 to 6 feet in thickness, underlaid by a porous waterbearing limestone.

The proposed sewerage system is to be constructed entirely on the separate plan. The sewage will be almost entirely of domestic origin. Street washings and roof water will be excluded, and these wastes will be carried off by natural surface drainage. All of the sewers are to be of vitrified sewer pipe, ranging from 6 inches to 10 inches in diameter, and the system will have a total length of about $2\frac{1}{2}$ miles. Manholes will be placed at all changes of grade and direction, there being a total of 18 manholes provided. No flush tanks are to be used and it is intended to clean the sewers by means of a fire hose. Ventilation is provided by perforated manhole covers and house vents.

The sewers are designed so that all of the sewage will be conducted to one outlet. The sewage will be discharged into the Stillwater River through a 10-inch outfall sewer having a total length of about 4,000 feet and a fall of 70 feet from the village to the stream. The outlet is located three-fourths miles southwest of the village. No details showing the grade and elevation of the outfall sewer and the construction of the outlet were furnished by the engineer. It was, however, stated by him that the invert at the outlet would be approximately 1.5 feet above the Stillwater River at medium stage. At the point of the proposed outlet the flow in the stream is rather sluggish owing to a bend and widening of the channel. The depth of the stream at this point is about 6 feet during medium stage. Some 1,500 feet below the river is very shallow and the velocity of flow considerably greater. No stream flow measurements are available, but observations

would indicate that at all stages the flow is sufficient to dilute the sewage of 500 persons.

The estimated sewage flow for the next few years is 20,000 gallons per day, which figure represents the present water consumption of the village. Eighty connections will be made to the sewers during the next year and the ultimate number of connections will be about 200.

In the vicinity of the proposed outlet there is available sufficient level land to provide for future location of sewage purification works should such become necessary. It is of the utmost importance, however, that this contingency be kept in view and that the grade and elevation of the outfall sewer be made so as to permit of the construction of purification works without pumping.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the Board considered the general plan submitted October 20th, 1911, by Mr. A. C. Reed, village engineer, for a sewerage system for the village of Pleasant Hill, providing for the discharge of untreated sewage into the Stillwater River.

This plan was approved upon the following conditions:

1st. That sewage purification works be installed whenever deemed necessary by the State Board of Health, and with this in view that the outfall sewer be constructed with such grade and elevation as to permit of the installation of a gravity plant;

2nd. That the outlet be submerged and carried to a point in the Stillwater River at least 20 feet from the bank;

3rd. That detailed plans and profiles of the sewerage system, including the outfall sewer and outlet, be submitted to and receive the approval of the State Board of Health;

4th. That accurate records be kept of the location and nature of all connections to the sewers, by a properly appointed official; and,

5th. That this approval be void unless construction shall have been begun before July 1st, 1912.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR PLEASANT RIDGE.

On July 22nd, 1911, The Riggs and Sherman Company, of Toledo, consulting engineers, submitted plans for sewerage and sewage purification proposed for Pleasant Ridge. In anticipation of the submission of the plans, the assistant engineer visited Pleasant Ridge on May 1st, 1911. The plans were referred to the engineering department and the following report was submitted:

Pleasant Ridge is a village having a population of 1,770, located in Hamilton County, about seven miles northeast of the center of the city of Cincinnati. The village is a suburban residential community and has no manufacturing activities. For the past few years, owing to its favorable location, it has experienced a rapid growth, and with the addition of sewerage facilities its future growth will undoubtedly be quite active. Pleasant Ridge has for a number of years been provided with a public water supply from the Cincinnati water works, but has no other municipal improvements.

The village is located upon the divide between the watersheds of Mill Creek and Duck Creek. The natural drainage from the principal portion of the village, however, is toward the latter stream, and only the northwestern portion drains to Mill Creek. The topography in the central portion of the village is rolling, but on all sides, the country is deeply dissected by the valleys of numerous small streams.

At the present time there are no sewers in the village except a few short storm water drains. The recent rapid growth of the village has emphasized the necessity of installing sanitary sewers and a system is to be placed which will extend over the principal portion of the village.

PROPOSED PLANS.

The plans submitted by the consulting engineers in brief provide for the installation of a comprehensive system of sanitary sewers, at the outlet of which is to be placed a purification works, consisting of a screen chamber, sedimentation tanks, and intermittent sand filters. The effluent is to be carried some distance from the plant and discharged into Duck Creek.

Sewage Flow.

The estimated sewage flow for five years is 180,000 gallons per 24 hours, based on a population tributary to 1,800. The rapid growth of the village will increase these figures materially in the next ten years and ultimately a sewage flow of 300,000 gallons or more will have to be provided for.

Sewerage System.

The design of the sewerage system has been rendered difficult not only on account of the topography, but also because of the difficulty of conveying the sewage to a suitable point of discharge where purification works could be built. None of the numerous small ravines offer sufficient area for this purpose without entailing excessive cost in construction. The question has been solved, however, by the design of trunk sewers, which will follow certain of the ravines and will take advantage of the rights of way of the Pennsylvania and Cincinnati,

Lebanon & Northern railroads. By this means it will be possible to convey the sewage to a single point of discharge located in the extreme southeasterly portion of the village.

The sewers are to be constructed of vitrified pipe varying from 8 inches to 20 inches, to be laid in accordance with standard specifications. At points where the sewers are carried across ravines conduits supported upon concrete piers are to be used. Cast iron pipe is to be used at certain points on the system, especially along the right of way of the Cincinnati, Lebanon & Northern Railroad. The sewers are to have a total length of 13.15 miles, and will be available to practically all residents of the village.

Purification Works.

The sewage purification works, which are to consist of screening, settling and filtering devices, are to be located on what is known as the Stegemoeller site, which is situated in the extreme southeasterly portion of the village. The site is adjacent to a small stream which will receive the effluent from the Kennedy Heights sewage purification plant. The main outlet sewer of the sewerage system ends in a manhole on the west side of the small stream and the sewage is carried from this manhole to the purification works on the east side by a line of 12-inch cast iron pipe 750 feet long, which has a fall to the stream, where a blow-off is located, and a rise to the purification works. The total fall between the manhole at the end of the outfall sewer and the flow line in the screen chamber at the purification works is 7.1. A connection with the main effluent drain from the plant provides means of by-passing the sewage in an untreated condition directly to the outlet.

Screen Chamber. The screen chamber is a concrete structure with an oval plan and uncovered. It is divided into two compartments by a wall extending longitudinally through it. In each compartment are to be placed two screens having 2-inch and 1-inch free spaces, respectively. The screens are kept partly submerged by the fact that the outflow from the screen chamber takes place over weirs.

Sedimentation Tanks. The sedimentation tanks, of which there will be two, are rectangular in plan, constructed entirely of reinforced concrete and provided with a concrete roof. The tanks are each 70 feet in length with an average depth of 7 feet to the flow line. One of them is 12 feet 3 inches in width, the other being 8 feet 3 inches in width. Their capacities are therefore 45,000 gallons and 30,000 gallons respectively. Based on a sewage flow of 180,000 gallons per day, the period of retention afforded by the tanks working independently will be 6 hours and 4 hours, respectively. With both tanks in operation the period will be 10 hours. The sewage enters each tank through a well arranged inlet channel and flows from the opposite end over a trapped weir into an outlet

channel leading to the dosing chamber. The tank is provided with hanging baffles at 16-foot intervals through its length. It should be noted that the hanging baffles at the inlet and outlet end alone serve a good purpose, while the three intermediate ones should be removed and a submerged baffle extending from the floor substituted.

The bottoms of each of the tanks are sloped to a central sludge gutter which leads to a 12-inch cast iron pipe sludge drain leading to the sludge bed. The sludge filter is 70 by 130 feet in plan, having an area of 9100 square feet. The contents of the larger sedimentation tank will flood the sludge bed to a depth of 18 inches. The filtering material of the sludge filters is to be 12 inches of sand, 6 inches of gravel, 1-8-inch to 1-2 inch, and 6 inches of broken stone or coarse gravel. The underdrains are to be connected with the distributing troughs on one of the sand filters so that the effluent from the sludge bed will be further purified by filtration through the sand filters.

The effluent from the sedimentation tanks is to be carried through a 12-inch cast iron pipe into a concrete channel supported upon the dividing wall between two of the filtering units. This channel will convey the sewage to the dosing chamber.

Dosing Chamber. The dosing chamber or control house in which the automatic apparatus is to be contained, is to be placed in the center of a group of four sand filters. It is to be constructed of concrete, and shelter for the apparatus and operator are to be provided by a brick superstructure. The dosing chamber itself is to be 24 feet by 30 feet in plan, and 4 feet in depth, with a capacity of 21,600 gallons. This volume of dose will flood the filter unit to a depth of 2 inches. The type of automatic apparatus to be used is not shown on the plans.

Sand Filters. The filters are arranged in a group of four units, each of which is 100 feet by 170 feet. The group is entirely surrounded by earth embankments, while the division walls between the units are of concrete. The total area of the plant is 68,000 square feet or 1 1-2 acres. This area provides one acre to each 1200 persons tributary, or one acre for 120,000 gallons sewage flow. As has been stated, each unit will be flooded 2 inches to the dose; and with a sewage flow of 180,000 gallons, there will be two cycles per day. The filtering material is to consist of 24 inches of sand, 6 inches of gravel, 1-8 to 3-4 inch, and 6 inches of gravel or broken stone 3-4 inch to 2 inches. The sewage is to be distributed over the surface by means of a system of distributing troughs reaching all parts of the filter. Four-inch hard tile underdrains in lines spaced 10 feet on centers provide ample drainage. These enter a line of 20-inch vitrified sewer pipe which conveys the effluent to Duck Creek.

ACTION OF THE BOARD.

At a meeting held August 10th, 1911, the State Board of Health considered the plans for sewerage and sewage purification for Pleasant

Ridge, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, on July 22nd, 1911, and they were approved upon the following conditions:

1st. That the sewage purification plant be completed before any of the proposed sewers are placed in use;

2nd. That the plant be enlarged whenever in the opinion of the State Board of Health such enlargement becomes necessary;

3rd. That the village council provide for the appointment of a sewer superintendent, and specify that he shall have responsible charge of the sewer system and sewage purification works; and that a certified copy of the ordinance providing for the appointment of such a superintendent be filed with the State Board of Health before the letting of any contract for construction work;

4th. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

5th. That this approval be void unless construction of sewage purification works is commenced before January 1st, 1913.

September 20th, 1911, the council of Pleasant Ridge passed Ordinance 852, providing for a superintendent of sewers, in compliance with Condition 3, of the State Board of Health's approval, and filed a copy with said Board on the 27th.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR PIQUA.

On March 30th, 1911, plat and profile of a proposed sewer in South Main Street, Piqua, were submitted by Mr. T. D. McClay, director of public service, and Mr. D. S. Lindsey, city solicitor. The plans were referred to the engineering department, and after making an investigation on the ground, the following report was submitted:

The present population of Piqua is about 13,400, and the area within the corporation limits is approximately four square miles. The greater part of the city is sewerage on the separate plan, and the main outlet of the system, which was established before the State Board of Health had jurisdiction in these matters is into the Great Miami River in the south-central part of the city. The total length of the present sewerage system is about six miles.

In addition to the above, there is a combined sewer with outlet into the Great Miami River about 1,000 feet north of the southerly corporation line of the city. This sewer, known as the Commercial Street sewer, was approved by the State Board of Health in 1899 for storm water only; but in 1902 approval was given for extending this sewer to the Favorite Stove Works and using it as a sanitary sewer.

The present proposed plan consists simply in constructing in South Main Street a 12-inch sanitary sewer having a total length of about 5,000 feet, which will connect with the Commercial Street sewer a short distance above its outlet. Provision for 140 house connections will be made when the sewer is constructed, although at present there are not more than 20 houses and two small factories which would connect with the sewer.

In view of the fact that no evidence is available to show that the discharge of sewage from Piqua at present causes a nuisance in the river, and furthermore, in view of the fact that the proposed South Main Street sewer besides being a small project in itself involves no new outlet, there would seem to be no reason why the proposed plans should not be approved.

ACTION OF THE BOARD.

At a meeting held April 21st, 1911, the State Board of Health approved the project for constructing a sewer in South Main Street, Piqua, as shown on plat and profile submitted by Mr. T. D. McClay, director of public service, and Mr. D. S. Lindsey, city solicitor, March 30th, 1911, upon the condition that this approval shall become void if the sewer is not constructed before January 1st, 1913.

REPORT ON PROPOSED SEWERAGE FOR PUT-IN-BAY.

On September 27th, 1911, there were received from Mr. T. B. Alexander, mayor of Put-in-Bay, plans for proposed sewerage for a portion of the village. Subsequently plans which are essentially duplicates of those received September 27th, 1911, were submitted on October 15th, 1911, by Mr. C. E. DeWitt, engineer for the village. Approval of the plans was requested in a communication from the mayor of Put-in-Bay under date of December 11th, 1911. On December 14th, 1911, one of the engineering assistants conferred with the mayor and engineer of the village at Sandusky in regard to the proposed improvements. The following report was submitted:

The village of Put-in-Bay is located on the north shore of South Bass Island in Lake Erie. The population is about 475, which number is increased to 3,000 or more by summer visitors. The village has a public water supply approved by the Board in April, 1909, and installed in 1910; the supply being derived from Lake Erie through an intake 100 feet from the southerly shore of the island. Previous to the installation of a public water supply the water supply of the village was largely obtained through intakes at the northerly shore of the island along the water front of the village. The large hotels were all thus supplied. These

private intakes were generally abandoned with the installation of the public water supply, although several remain in use.

Present Sewerage. Plans for sewerage for the village were first considered by the Board in January, 1907, when it was proposed to construct several main sewers discharging at convenient points along the water front of the village. At this time the water supply of the hotels in the village was taken from the northerly side of the island through private intakes, and the action of the Board in regard to the proposed sewers was largely guided by this fact. The action is set forth in the following letter:

"COLUMBUS, OHIO, January 28th, 1907.

Mr. J. C. Oldt, Mayor, Put-in-Bay, Ohio.

DEAR SIR:—The State Board of Health, at a meeting held January 23rd, 1907, considered the plans for proposed sewerage for the village of Put-in-Bay submitted by you on January 19th, 1907.

You are hereby notified that these plans were disapproved unless all existing water supply intakes on the northerly side of the island be abandoned and the supply for the corporation be taken from an intake to be located on the south-easterly side of the island at a point to be approved by the State Board of Health.

If the water drawn from this intake is used without filtration, it will be necessary to locate the intake at a much greater distance from shore than would be necessary if the water were filtered before delivering to consumers.

Yours truly,

(Signed) C. O. PROBST,
Secretary."

In 1909 two sanitary sewers were constructed within the village. One outlet was established near the foot of Catawba Avenue, the other being located some 200 feet west of the foot of Hartford Avenue. At the time these outlets were established the water supply was still taken from the northerly side of the island. The outlets are both less than 20 feet from the shore and are at times exposed. Owing to the low sewage flow and the large dilution afforded by the lake, it is likely that no nuisances are created.

Aside from these sanitary sewers there are at present two poorly constructed drains in the easterly part of the village, both of which receive considerable domestic wastes. They discharge upon the surface of the ground near a number of dwellings and it is largely to abate the nuisance thus caused that the present sewer extension is proposed.

Present Water Supply. The water supply taken from the southerly side of the island is well removed from the influence of sewage from Put-in-Bay and is of fair quality. The intake is about 100 feet off shore. The distribution system consists of about one mile of pipe, and there are at present 55 services in use. There are, however, several residences and at least one large boarding house which are not accessible to the distribution system and which are furnished by private intakes from the lake.

Proposed Sewerage. As shown on the plans submitted, the proposed sewerage is to consist of a sewer in Toledo Avenue, about 1200 feet in length discharging into the lake with alternate outlets located at the foot of Toledo Avenue and 125 feet to the eastward. It was also verbally proposed by the mayor in the conference of December 14th to discharge the proposed sewer through the Hartford Avenue outlet. The proposed sewer is to be of 12-inch vitrified pipe and will receive in the summer time a large amount of domestic sewage from three large boarding houses which together furnish accommodations for some 500 to 600 persons. There are also a number of residences which will be accessible to the sewer.

ACTION OF THE BOARD.

At a meeting held December 20th, 1911, the State Board of Health considered the plans of existing and proposed sewerage for Put-in-Bay, submitted by Mr. T. B. Alexander, mayor, September 27th, 1911.

The plans for proposed sewerage, to consist of a sewer in Toledo Avenue about 1200 feet in length discharging into the lake with alternate outlets located at the foot of Toledo Avenue and 125 feet to the eastward, were disapproved.

The authorities were notified that the Board would require that an engineer of experience in sewage disposal be retained to make a study of the sewerage question at Put-in-Bay, this study to embrace the possibilities of carrying the sewage far enough into the lake to be carried away by lake currents, or of disposing of the sewage by some system of sewage purification.

REPORT ON PROPOSED SEWERAGE FOR READING.

On March 24th, 1911, plans and specifications for a system of sanitary sewers for Reading, prepared by Mr. D. S. Hosbrook, village engineer, were submitted to the State Board of Health for approval. These were referred to the engineering department, and on April 3rd, 1911, the assistant engineer visited Reading and accompanied by the village engineer made an inspection on the ground. The following report was submitted:

Reading is a village of about 4,000 population, situated on the east bank of Mill Creek about nine miles north of the center of the city of Cincinnati. The community is principally of a residential character and contains but one manufacturing industry, a glass works which employs about 100 men. The topography within the village is rather level, the entire built up portion being situated on the level bottom land of the creek valley. There is, however, sufficient slope to the surface to provide adequate means of drainage. The village is at present provided with a

public water supply obtained from drilled wells, but has installed no other municipal improvements.

The sanitary conditions within the village are rendered very unsatisfactory owing to the absence of sewerage facilities. It has become the custom among the citizens to discharge laundry and sink wastes of an objectionable nature into the street gutters, and this results in both unsightly and unsanitary conditions. In June 1910, the State Board of Health was called upon to investigate a nuisance arising from the pollution of a small ditch which flows in a general southwesterly direction through the village. This ditch was found to receive sewage from a large convent located in the highlands immediately east of Reading as well as contamination from dwellings within the village itself. In certain seasons of the year the nuisance was very pronounced and almost unbearable. It is principally to abate these unsanitary conditions that the system of sewers is proposed.

Proposed Sewerage. The plans prepared by the village engineer provide for the installation of sanitary sewers to be constructed of vitrified pipe, ranging in size from 8 inches to 24 inches. The length of the system is to be 9.6 miles, of which the 8-inch pipe is to cover a distance of 6.9 miles, the 10-inch pipe 1.0 mile, and 12-inch to 24-inch pipe 1.7 miles. The system as designed will cover practically the entire built up portion of the village, and it is also the intention to provide for the removal of sewage from the Notre Dame Convent before referred to.

No plans for purification works are included, and the design of the sewer system provides for the discharge of the crude sewage into Mill Creek. The outlet is to be located at the foot of Southern Avenue at the southerly limit of the built up portion of the village. At the present time there are only a few houses within a radius of 500 feet of the point of outlet, but the topography of the section is such that future growth of the village in the vicinity is probable. Near the outlet immediately south of Southern Avenue is an available site for purification works, and it is the intention of the village to secure an option on this property to provide for future construction of purification works should such become necessary.

Mill Creek, which is to receive the sewage, has a watershed area above Reading of 78 square miles. Its flow during the dry seasons of the year becomes very low, and the discharge of crude sewage at Reading will without doubt create a decided nuisance in the vicinity. The extent to which this nuisance will be objectionable depends largely upon the growth of the villages of Reading and Lockland near the stream. Mill Creek is already polluted above the proposed outlet by wastes from a woolen mill at Lockland and by sewage and industrial wastes. About one and one-half miles below Reading the west fork of Mill Creek joins the main stream, and this tributary receives a large amount of sewage from Wy-

oming and Lockland. The former village in 1909 constructed a sanitary sewerage system and sewage purification works, but owing to failure of the sewage pumps, the crude waste is discharged into the stream direct. At Lockland in 1909 sanitary sewers were built and a portion of the sewage purification works planned at that time. At present the sewage passes through septic tanks and is discharged into Mill Creek in an unpurified state. The condition of Mill Creek below the villages of Hartwell, Carthage, and Elmwood, has been described in previous reports. The large amount of sewage discharged from these villages creates objectionable conditions in the stream, and after entering the city of Cincinnati the stream is further polluted by the discharge of industrial wastes from a large number of factories along its course. It appears therefore that the question of the discharge of crude sewage into Mill Creek at Reading should be considered from the standpoint of the creation of a local nuisance.

The only public water supply which might possibly be affected by the discharge of sewage into Mill Creek is that of the city of Cincinnati located at California. The construction of a dam in the Ohio River at Fernbank will raise the level of the river to a 9-foot stage and will cause slack water for a considerable distance above the city. The pollution of the Cincinnati water supply would be possible with these conditions by wind induced surface currents in an upstream direction. This question, however, is one that is now being considered by the officials of the Cincinnati water works, and it is quite likely that if the pollution is found to exist, the city will undertake improvements in sewerage both within Cincinnati and along the valley of Mill Creek above the city. If this is done, the sewage from the entire Mill Creek district will be collected and discharged with that from the city of Cincinnati into the Ohio River below Fernbank.

With these considerations it is evident that the construction of sewage purification works at Reading would accomplish little in improving the polluted condition of Mill Creek. Pending the action of the city of Cincinnati, the village should be permitted to establish an outlet into Mill Creek for a limited term of years.

ACTION OF THE BOARD.

At a meeting held April 21st, 1911, the State Board of Health approved these plans and specifications for a system of sanitary sewers for Reading, with outfall into the east branch of Mill Creek; prepared by Mr. D. S. Hosbrook, village engineer, and submitted March 24th, 1911, with the provision that the plan for the outfall be such as to admit of the addition of a disposal works in the future if such should be found necessary.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR SALEM.

On May 23rd, 1911, a communication was received from Mr. L. E. Chapin, consulting engineer for the city of Salem, describing certain proposed changes in the plans for sewage purification for Salem, which plans were approved by the State Board of Health in 1906. As the Board had recently decided that these original plans should be resubmitted before being carried out, the question of the suitability of the old plans, modified as now proposed, was referred to the engineering department and the following report submitted:

Plans for proposed sewage purification for Salem, prepared by Messrs. Chapin and Knowles of Canton, were approved by the State Board of Health on October 17th, 1906, with the following conditions:

"1st. That the plant be enlarged, in a manner satisfactory to the State Board of Health, when deemed necessary by said Board;

"2nd. That the dosing pond be reduced so that it will hold about 50,000 gallons;

"3rd. That the automatic apparatus be replaced by a single siphon discharging, by means of gates, on to any filter desired;

"4th. That the entire area of filters as shown on the plans be constructed as the first installation, and,

"5th. That the method of operation of the plant be at all times satisfactory to the State Board of Health."

A description of these plans will be found on pages 179-181 of the Annual Report of the State Board of Health for 1906. Since the plans were approved, no definite steps have until recently been taken toward installing the plant, although the site has been purchased and a 24-inch intercepting sewer two miles long has been constructed with outlet into the creek at the sewage purification site.

Since the approval of the plans, five years ago, several miles of lateral sewers have also been constructed in Salem, so that at present there are more than 13 miles of sewers including the above mentioned interceptor. A large portion of the sewers of the city are tributary to the new interceptor and are on the separate plan. Some of the older sewers, however, are on the combined plan, and these connect with a 24-inch brick sewer which discharges into a ditch near the center of the city. This ditch also receives the acid iron wastes from a wire mill, which have a deodorizing effect upon the sewage.

It is proposed to divert the dry weather flow from the brick sewer and its tributaries, into the new interceptor, and to use as a storm water overflow the existing outlet into the above mentioned ditch. It is believed that this arrangement will not, at least for many years, cause any complaint,

The reason for the present activity in regard to the installation of the sewage purification plant, is due to the fact that during the past year complaints have been made by property owners below the city in regard to the pollution of the creek by sewage. This resulted in a petition being made by the Salem council to the State Board of Health under the Bense Act, in regard to conditions. The city took this step, apparently because it desired that the State Board of Health issue a Bense Act order, thus enabling council to appropriate the money for the necessary improvement without exceeding the "Longworth" debt limit. In answer to the petition, the State Board of Health investigated the existing conditions, and after giving the Salem authorities an opportunity to be heard, on February 25th, 1911, issued an order to the city to abate the nuisance complained of, which order was duly signed by the Governor and the Attorney General.

The Sewage Purification Plans as now Submitted. It is proposed to construct the sewage purification plant on the original proposed location. This site covers an area of some 20 acres and is located two miles west of the corporation limits and immediately north of the Pennsylvania Railroad. There are no houses within 1000 feet or more of the site, and but few within a mile.

The present plans, as was the case with the original ones, are prepared on the basis of treating 1,000,000 gallons of sewage daily. As the population of Salem has increased only 900 since the first plans were drawn, the proposed capacity is ample and will take care of the future increase in sewage flow for several years.

The method of purification proposed is sedimentation, followed by intermittent sand filtration. The sewage on arriving at the plant first passes through an open settling tank divided into three compartments, each 20 feet by 100 feet by 10 feet, and having a total capacity of about 400,000 gallons or less than ten hours' flow. The floors of the tanks have a slope toward the center, from which point the sludge is to be drained off into a pump well, and from there is to be raised, by means of a centrifugal pump operated by a gas engine, on to a near-by sludge bed. The proposed tank differs from the original one in that it is uncovered, is 20 per cent. smaller than the old one, and the grit chambers have been omitted. Nevertheless, the present design affords ample capacity for a sedimentation tank to be operated under local conditions.

The settled sewage passes into a dosing "pond" holding some 50,000 gallons. The contents of this pond, which are sufficient to flood one filter to a depth of 4 inches, will be discharged on to the filters by means of a single 4-inch Miller siphon. The application of the sewage to any one filter is made possible by a system of channels and gates.

The sand filters are eight in number and each has an area of about 28,000 square feet, making a total area of 5.5 acres. They are to con-

tain 3 feet of Lake Erie sand or other material satisfactory to the State Board of Health, and are to be suitably underdrained by vitrified tile pipe from 3 to 10 inches in diameter. Wooden distributing tanks are to facilitate the distribution on the filter surface.

The sludge bed, to be located between the settling tanks and the creek, is to be 100 feet by 140 feet in plan and to contain 18 inches of sand and gravel.

The proposed plans and method of sewage treatment at Salem are satisfactory and suitable for local conditions. The effluent produced, with proper operation, should be of a high degree of purity and suitable for discharging into First Culbert Creek.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health approved the plans for a sewage purification plant for Salem, as shown on the original approved drawings submitted in 1906 and as modified in accordance with the communication received from Mr. L. E. Chapin, consulting engineer, May 23rd, 1911, and in accordance with the revised drawings submitted May 26th, 1911, upon the following conditions:

- 1st. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed;
- 2nd. That the entire area of the filters, as shown on plans, be constructed before the plant is placed in service;
- 3rd. That the city place a competent man in charge of operating the plant;
- 4th. That the banks surrounding the filters be sodded immediately after they are constructed and before the filtering material is placed; and the dosing pond banks be suitably paved; and,
- 5th. That this approval be void unless construction of the plant is commenced before July 1st, 1912.

REPORT ON PROPOSED STORM WATER SEWER FOR SANDUSKY.

On June 16th, 1911, plans were received from Mr. C. M. King, city engineer of Sandusky, for a storm water sewer to be constructed to drain a portion of the city. Based on a knowledge of local conditions secured during previous visits, and a review of the proposed plans, the following report was submitted:

The sewerage of Sandusky has been constructed almost entirely on the combined plan and discharges into Sandusky Bay through seventeen or eighteen outlets. The principal outlets discharge along the northwest water front, but there are several sewers discharging along the northeast

water front at distances of 3000 feet or less from the water works intake crib.

In May 1910, it was proposed by the city to construct a combined sewer to supply drainage and sanitary sewerage for a section of the city lying south of the Lake Shore Railroad. It was proposed to establish an outlet into Pipe Creek at the Columbus Street bridge, or into Sandusky Bay at a point about 7-8 mile southeast of the water works crib. At a meeting of the Board held July 27th, 1910, the proposed plans were considered, and it was voted to request the city to submit plans for a new water works intake at the next meeting of the Board, October 19th, 1910, and to withhold action in regard to the plans for proposed sewerage until that time. No plans for extension of the water works intake were submitted, and the project of the construction of the proposed sewers was given up by the city.

It is now desired to construct storm sewers in place of the originally proposed combined sewers for a portion of the district shown on the above mentioned plans of May 19th, 1910. The storm sewers will extend over an area south of the Lake Shore Railroad and east of the B. & O. Railroad, north of Perkins Avenue. The sewers are to be constructed of concrete and vitrified pipe, and range in size from 10 to 24 inches in diameter. The total length of the proposed sewers is 8,500 feet, and the area drained is 145 acres. The sewer is to receive surface drainage, admitted through catch basins, but will not be used for sanitary purposes. The estimated cost of the present proposed installation is \$12,900.

The proposed outlet for the sewer is located in Pipe Creek at the Perkins Avenue bridge. This point is about one mile below the outlet proposed in 1910 at the Columbus Street bridge, and is several miles above the mouth of the stream at the bay. A branch of Pipe Creek already receives the effluent from the sewage purification works of the State Soldiers' Home.

The provision of storm sewers for the districts as proposed is urgent on account of the flatness of the topography and the slow drainage which now exists. The use of the sewer for sanitary purposes, however, would create a nuisance in Pipe Creek, which is a rather sluggish stream with small flow, and would add pollution to Sandusky Bay along the northeast water front and thus deteriorate the quality of the public supply. Regulations should be made and strictly enforced by the city council to prevent the use of the proposed sewer for sanitary purposes.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the plans for a storm water sewer for the southeastern portion of Sandusky, as shown on drawings submitted by Mr. C. M. King, city engineer, on June 16th, 1911, upon the following conditions:

1st. That before constructing the sewer, council pass an ordinance prohibiting the use of this sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and,

2nd. That this approval be void unless construction is commenced before January 1st, 1913.

REPORT ON PROPOSED COMBINED SEWER FOR MILLS CREEK DISTRICT, SANDUSKY.

On November 22nd, 1911, plans were submitted by Mr. John Bing, director of public service of Sandusky, for a proposed sewer for the Mills Creek District of that city. An examination was made on the ground by one of the engineering assistants on December 1st, 1911. The following report was submitted:

The sewers of Sandusky have been constructed according to no comprehensive plan and have been built piecemeal, as needed, and generally on the combined plan. The entire sewage from the city, including manufacturing wastes, is discharged into Sandusky Bay through about eighteen independent outlets. The greater number of these enter the bay along the northwest water front of the city, but there are also a few sewers discharging along the northeast water front. The discharge from these latter outlets is especially significant owing to the proximity of the water works intake which is within 3,000 feet of three of the outlets. From two of the outlets the sewage in reaching the mouth of Sandusky Bay must pass directly over or in close proximity to the water works intake. The sewage from the other outlets on the northwest water front may and probably does reach the intake when impelled by wind currents. The shallowness of the bay also adds to the seriousness of the danger of pollution, as a wind of ordinary velocity will agitate the entire bay and stir up sewage deposits from its bottom.

Proposed Sewer. The Mills Creek Sewer District, so-called, lies adjacent to Mills Creek, which stream is in the extreme westerly portion of the city. The stream enters Sandusky Bay at a point about $2\frac{1}{2}$ miles from the water works intake. The proposed sewer is in reality the extension of an existing sewer. There is at present an old 24-inch, circular brick sewer, which receives the wastes from the Cleveland and Sandusky Brewing Company, and from the Sandusky Wine and Brandy Company, discharging the same into Mills Creek about one-half mile above its mouth at Sandusky Bay. The general project of the proposed sewer contemplates the extension of this old 24-inch brick sewer, abandoning the present outlet and conducting the sewage in a northerly direction to Sandusky Bay.

The wastes from the two plants mentioned are of a highly putrescible nature and at present create an extreme nuisance in Mills Creek. This stream has but a small flow and along its course below the sewer outlet it was found on the day of inspection to be in a high state of putrefaction. There was also a heavy deposit of dark sludge in the bottom of the creek. The present sewer is used to but slight extent to receive domestic sewage, as it passes through a slightly built up district. Vigorous complaints, however, have been registered against the condition of Mills Creek, and it is largely to abate this nuisance, as well as to provide sanitary conveniences for the district, that the new sewer is proposed.

The proposed sewer for the district will provide for the abandonment of the lower portion of the old sewer and will conduct the sewage in a northerly direction to Sandusky Bay. The new sewer will be of vitrified pipe from 18 to 24 inches in diameter, and will have a total length of about one-half mile. The drainage area is some 50 acres, about 50 per cent. of which is built up. Storm water and sewage will be removed from the district by the proposed sewer. There are anticipated but few house connections to the sewer for several years. The volume of wastes from the two plants before mentioned is estimated to be in the neighborhood of 650,000 gallons per day, which includes sewage from about 100 employees.

The proposed outlet is located about 100 feet west of the docks of the M. A. Hanna Coal Company, at the shore of the bay. The sewer is to discharge above the mean level of the bay, which will place the outlet at a point about 60 feet from the mean water line. In view of the highly putrescible wastes which the sewer will discharge, this condition would no doubt create a nuisance.

Past Actions of the State Board of Health. In considering the present project, it is of value to note the past actions of the State Board of Health in regard to the sewerage, as well as the water supply of Sandusky. The water supply being drawn from the bay at a point about 1,400 feet from the northeast water front of the city, correlates the problems of sewerage and water supply.

In 1906 the State Board of Health approved a proposed sewer in Adams Street, at the foot of Warren Street, which outlet is located on the central-northwest water front. This approval was given without conditions. In 1907, previous to the construction of the water purification works, a committee of the Board visited Sandusky and submitted a report outlining thoroughly the dangers attending the use of Sandusky Bay as a water supply and as a receptacle for the sewage of the city. This report contained the following conclusions:

- "(1) No more unpurified sewage should be discharged into Sandusky Bay until an improved water supply is obtained.
- (2) The location of the water supply intake is such that, even with filtration, a safe and satisfactory water cannot be obtained at all times.

"(3) The water supply and sewerage situation at Sandusky is in an unsatisfactory condition; and before the city spends money for filtration or other water works or sewerage improvements, it is important that the whole matter be carefully studied by an expert and that estimates be made of the cost and practicability of extending the intake to a location farther removed from the shore. Such location should be decided upon only after careful studies of the currents, and analyses of the water under different conditions. It may be found desirable to move the entire water works, including a future filtration plant, to a point two or three miles east of Sandusky and there extend the intake into Lake Erie.

"(4) After the best plans for ultimately obtaining a safe water supply have been worked out, all future additions and improvements to the water works should be made in a manner consistent therewith; although it may be impossible to complete the plans for some years."

This report was submitted to the local officials, but notwithstanding the advice, the water supply problem was given no study by expert talent and plans were made for the construction of a water purification plant with the use of the old intake. The plant was completed in 1908.

In May, 1910, plans were submitted for a proposed combined sewer to be constructed for the southern part of the city and with an outlet into the bay about 7-8 mile southeast of the water works crib. In July 1910, the Board voted to withhold action in regard to the proposed sewer until the city submitted plans for a new water works intake. This the city failed to do and the sewer project was dropped. In June, 1911, plans were submitted for a proposed storm sewer for practically the same district, with an outlet located in Pipe Creek, a small stream which discharges into Sandusky Bay some two miles southeast of the water works intake crib. These plans were approved in July, 1911, with the provision that council pass an ordinance prohibiting the use of the sewer for sanitary purposes.

Quality of Water Supply. The installation of a water purification plant in 1908 without doubt improved greatly the quality of the water supply of the city. The plant was, however, designed without expert study of the problem, and there are many defects in both the design and construction of the plant. The raw water obtained from Sandusky Bay is at all times contaminated and, under certain conditions of currents in the bay, is often extremely polluted; and at such times an excessive burden is placed upon the filter plant, and analyses have indicated that the effluent is not constantly of a high standard of purity. Examinations of the State Board of Health have revealed the fact that the filtered water is not all that could be desired, and the city has been urged to take steps for improving the plant, primarily by the extension of the water works intake, but also by enlarging the plant and providing for capable superintendence. So far the city has failed to take up the question of improving the plant and has even failed to put in charge an experienced operator.

The discharge of sewage into Sandusky Bay from a large number of outlets cannot be considered an entirely satisfactory means of disposal of the sewage, and the problem must sooner or later be solved by the construction of an intercepting sewer with perhaps some means of purification. At the present time, however, Sandusky Bay affords a suitable means for sewage disposal, inasmuch as it affords a high degree of dilution with the avoidance of any nuisance. It appears logical that Sandusky Bay be considered as the proper receptacle for the sewage of the city, whether untreated or partially purified. It cannot, therefore, be considered as a satisfactory source of water supply for the city, even with the presence of water purification works. With the entire removal of the sewage from the city there would still be the unavoidable pollution created by surface drainage, wastes from numerous vessels, etc., which would influence the water supply.

It therefore appears that in considering the proposition of proposed additional sewerage with outlets into Sandusky Bay, much consideration must be given the water supply of the city.

Reverting to the proposed sewer for the Mills Creek District, it should be noted that with the construction of the sewer no immediate increase in the volume of sewage entering the bay will take place, and, moreover, a nuisance which at present exists in Mills Creek will be abated. The sewer, however, provides means of removal of sewage from 50 acres within the city, and future growth of population with consequent extension of the sewer system will produce an appreciable increase in sewage flow and attendant pollution of Sandusky Bay.

ACTION OF THE BOARD.

At a meeting held December 20th, 1911, the State Board of Health disapproved the plans for a proposed combined sewer for the Mills Creek District, Sandusky, submitted by Mr. John Bing, director of public service, on November 22nd, 1911.

The attention of the authorities of Sandusky was called to the necessity of a comprehensive study of the water supply by an expert sanitary engineer, with a view to securing the supply beyond the influence of the sewage of the city, and also to the danger of increasing the pollution of the bay by the construction of new sewers before the water supply improvements have been made.

They were also asked to advise the Board within ninety days from date (December 22nd, 1911) what they intended to do in devising means to improve the public water supply and to correct present sewerage conditions.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR SHREVE.

On June 5th, 1911, there were received from L. E. Chapin, consulting engineer, plans and specifications for proposed sanitary sewers and sewage purification for Shreve. In anticipation of the submission of the plans and previous to the voting of bonds, the assistant engineer visited Shreve on March 21st, 1911, and made an inspection on the ground of the contemplated improvements. Based on this inspection and a review of the plans, the following report was submitted:

The village of Shreve is located in the southwestern portion of Wayne County in the valley of Shreve Run, a small stream which flows in a general easterly direction through the southerly and easterly limits of the village. The population, according to the 1910 Federal census, is 1,016. The village is primarily a farming center, having no manufacturing industries of importance. The topography of the surrounding country is rather hilly and this is true of a portion of the village itself, although the larger part is fairly level.

The village of Shreve is provided with a municipally owned public water supply, installed in 1910. Previous to this time the water supply was furnished by a private company. The new supply is of satisfactory quality, although the addition of sewerage facilities may tax the available quantity to its limit. The sewerage facilities have been greatly needed for a number of years, but until recently all attempts toward the installation of sewers have met with failure.

Briefly, the present project contemplates the construction of a complete system of sanitary sewers and a purification plant for the treatment of the sewage before it is discharged into Shreve Run.

Proposed Sewerage. The sewers, according to the proposed plans, are to cover practically the entire village and will be accessible to about 90 per cent. of the population. The system is to be composed of 6, 8, 10 and 12-inch vitrified pipe, having a total length of 3.8 miles. If the specifications are carried out, fairly tight joints will be obtained and ground water will therefore be largely excluded. Downspout connections from houses are to be prohibited by ordinance. The plans provide flush tanks for all dead ends and manholes at all changes in grade and direction of the sewers.

Sewage Purification Works. It is proposed to purify the sewage by the method of sedimentation and sand filtration. The plant is to have a capacity of 100,000 gallons, representing the sewage from about 1,000 people. It is to be located on a site covering an area of 2 1-2 acres, well outside the built up portion of the village in an easterly direction, the nearest house being more than 500 feet to the west. The site borders Shreve Run and the land is rather low, but is, however, not subjected to floods.

These sewage arriving at the plant through a 12-inch main sewer, is first screened by means of a wrought iron screen having an open space of one inch and located in a properly designed screen chamber. The screened sewage then passes into one or both of the two sedimentation tanks. These are covered basins 42 feet long, 8 feet wide, with an average depth of 9 feet, their combined capacity being therefore 44,000 gallons. Based on an ultimate sewage flow of 100,000 gallons daily, this represents a period of retention of 10 1-2 hours. Only one tank need be used for some time to come.

The lower portion of each tank is divided by a cross wall into two compartments in order to facilitate cleaning. The sludge drains are cast iron pipe, 8 inches in diameter, and extend to a suitably designed sludge bed located nearby.

The settled sewage overflows continuously into a dosing chamber which is adjacent to the outlet ends of the tank and is 40 feet by 10 feet by 4 feet. This represents a volume of 12,000 gallons, which is sufficient to flood one of the sand filters to a depth of 2½ inches. The tank is discharged by means of three 10-inch automatic siphons, operating in rotation, two of which are to discharge on to the two filters proposed for immediate installation, while the remaining one is to discharge upon the filter proposed for future extension.

For immediate installation the plans provide for two sand filter units, each of which is 60 feet by 120 feet, thus giving a combined area of 0.3 acre. With the construction of the third unit the area would be 0.46 acre. On the basis of the tributary population the area proposed for present use is rather small; and in any case, regardless of area, more than two units should be provided in order to facilitate cleaning.

The filters are to be constructed in excavation and surrounded by earth embankments. No provision, however, has been made for sodding these banks.

The filtering material is to consist, first, of a 6-inch layer of gravel, covering the entire bottom of the filters, over which is to be 27 inches of sand which, according to the specifications, will have an effective size of 0.4 and 0.6 m. m., and a uniformity coefficient of between 1.5 and 2.5. Provision has been made, by means of wooden troughs, for distributing the sewage over the surface of the sand, and the under-drainage proposed is also suitable.

The sludge filter, also in excavation and surrounded by earth embankments, is to have an area of 2,000 square feet, and is to be similar in construction to the sand filters.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved the plans for sewerage and sewage purification for the village

of Shreve, as shown on drawings submitted by Mr. L. E. Chapin, consulting engineer, on June 5th, 1911, provided:

1st. That the sewage purification plant be completed in a satisfactory manner before any of the proposed sewers are placed in use;

2nd. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; (Sand submitted October 10th, 1911, and approved October 27th, 1911.)

3rd. That the area of sand filters, for present installation, be increased by including therein the third filter shown on the plans, but intended by the designer for future construction;

4th. That more filter units be added whenever the number of persons contributing sewage to the plant reaches 600;

5th. That the thickness of the filtering sand, exclusive of the gravel, be not less than 3 feet at any point;

6th. That all slopes of the embankments surrounding the filters be suitably sodded either before, or immediately after, the placing of the sand;

7th. That the village council provide, before the plant is placed in use for the appointment of a competent superintendent of sewers, who shall keep records of all sewer connections and who shall operate the purification plant in a manner satisfactory to the State Board of Health; and,

8th. That this approval be void unless the plant is constructed on or before January 1st, 1913.

REPORT ON PROPOSED PRIVATE SEWER FOR THE E. T. COLLINS SUB-DIVISION, TOLEDO.

On November 7th, 1911, plans were submitted by Mr. E. T. Collins of Toledo, for a proposed private sanitary sewer for a small realty sub-division, located in the extreme northerly portion of the city of Toledo. On November 17th, 1911, one of the engineering assistants visited Toledo and inspected the location and point of discharge of the proposed sewer. The following report was submitted:

The E. T. Collins realty sub-division has an area of five acres and is located in the extreme northerly portion of the city at the intersection of Boulevard and Detroit avenues, and approximately 250 feet south of Ten Mile Creek. The tract is sub-divided into twenty building lots, although as yet no residences have been constructed.

Owing to the low general level of the sub-division it is impossible to obtain drainage into the city sewer on Detroit Avenue, and in order to facilitate the sale of the property it is proposed to construct a private

sanitary sewer immediately. The total ultimate population of the subdivision is estimated to be 100, while for two years the population will not exceed 40.

Proposed Sewer. The proposed sewer will have a length of approximately 1,000 feet and will be constructed of 8-inch or 10-inch vitrified pipe with cemented joints. It will receive domestic sewage, roof water, and cellar drainage. The proposed outlet is located at the southerly bank of Ten Mile Creek near the abutment of the Lake Shore and Michigan Southern Railroad bridge across the stream. The sewer will terminate in a bulk head but the outlet will be submerged.

Condition of Ten Mile Creek. Previous examinations of the State Board of Health have shown the extremely polluted condition of Ten Mile Creek, caused by the discharge of sewage from the Toledo sewers. The city has engaged the services of Mr. W. J. Sherman, consulting engineer, who is at present preparing a report looking toward improvements of Ten Mile Creek and Swan Creek. Data obtained by Mr. Sherman indicates that the normal flow of Ten Mile Creek is 10.73 second feet, or 5,950,000 gallons per 24 hours. Measurements of sewer discharges indicate a total quantity of about 8,000,000 gallons per 24 hours discharged into the stream. These figures indicate the extreme high degree of pollution. Three city sewer outlets and six private sewer outlets are located above the proposed Collins sewer outlet. It is evident, therefore, that at the latter point the stream is already grossly polluted.

In connection with the report on recommended improvements for Ten Mile Creek, tentative plans have been prepared for an intercepting sewer along the stream. Such a sewer, if constructed, would furnish an outlet for the proposed Collins sewer.

In view of the present extremely polluted condition of Ten Mile Creek, it is evident that the addition of the small amount of sewage from the proposed sewer will not affect the condition of the stream. It is moreover, true that the project should be considered as similar in its effect to an extension of the city sewers, which extension is prevented by topographical conditions. Furthermore, the condition of Ten Mile Creek cannot be improved by preventing the establishment of the outlet, but must be brought about by a comprehensive plan for the collection of the sewage already discharged into the stream. The sewage from the proposed sewer would be cared for in the execution of such a plan. However, it is thought that some treatment of the sewage is necessary.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the Board considered the plans for a proposed private sewer for the E. T. Collins Sub-Division, located in the extreme northerly portion of the city of Toledo, submitted by E. T. Collins on the 7th day of November, 1911.

These plans were approved provided:

1st. That a sedimentation tank of a design satisfactory to the State Board of Health be installed for the partial purification of the sewage before discharging it into Ten Mile Creek;

2nd. That the outlet from the tank be carried to the center of the stream and be submerged at all stages of the stream; and,

3rd. That this approval be void unless construction shall have been begun before March 1st, 1912.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR WASHINGTON C. H.

On May 13, 1911, plans and specifications for proposed additional sewerage for Washington C. H. were received from the clerk of the department of public service. On May 11, 1911, in anticipation of the submission of the plans, the assistant engineer visited that city and made a general inspection of the sewerage system and of the proposed additions. The following report was submitted:

Washington C. H. is the county seat of Fayette County and has a population of 7,277 according to the 1910 census. It is located on Paint Creek, which stream at this point has a watershed of 60 square miles and a small dry weather flow. The city has a public water supply, derived from wells, which is operated by a private company. The sewers now in use are entirely inadequate for the city. They are constructed principally on the combined plan, either as public or private sewers, and all discharge into Paint Creek at the most convenient points. There are some twenty independent outlets within the city limits, and the discharge from these causes very obnoxious conditions in the creek in dry weather and also offers a menace to the water supply of Greenfield, fifteen miles below, which supply is occasionally taken from the creek direct. The probable total length of existing sewers is about five miles, and there are 1,000 persons or more tributary thereto.

In 1902 plans for an improved sewerage system including sewage purification works were prepared by Mr. Frank M. Kennedy, city engineer, and Mr. H. J. Shaw, consulting engineer. The State Board of Health approved these plans, provided:

"1st. That the sewers and purification works be constructed in accordance with the amended plans without modification, unless such modification shall be approved by the State Board of Health.

2nd. That a sufficient bond issue be authorized to construct the proposed sewers and purification works.

3rd. That the sewage purification works shall be constructed as soon as the proposed changes in sewers shall have been made."

Nothing has been done to date in regard to carrying out the above plans. It is now proposed, however, to construct three new combined sewers in North Street, Temple Street, and Green Street, respectively, plans and specifications for these have been submitted for approval.

The North Street sewer is intended to drain the district lying west of the B. & O. Railroad and north of North Street. The sewer will consist of 1,800 feet of 10-inch vitrified pipe laid at a depth of about 7 feet. It will discharge into a county ditch just south of North Street, which enters Paint Creek a short distance downstream from the water works wells. This sewer is intended primarily to provide sanitary drainage for a number of houses which have recently been built and which now dispose of their wastes through cesspools and vaults in a manner that may contaminate the public water supply.

The Temple Street sewer will extend along that street from Main Street to Paint Creek. It will consist of 1,500 feet of 12-inch pipe laid at an average depth of 12 feet. It appears that the principal demand for this sewer is to afford drainage for a swimming pool now under construction at the Y. M. C. A. building. The outlet into Paint Creek is located beneath the Temple Street bridge.

The Green Street sewer is designed to provide for the removal of storm water and sewage from Green Street and Oakland Avenue. It will be 800 feet long and will consist of 12-inch pipe laid at an average depth of $5\frac{1}{2}$ feet. It will discharge into a small ditch located west of Oakland Avenue and immediately south of the B. & O. Railroad. This ditch passes under the railroad and enters another ditch which extends in a northerly direction to Paint Creek.

The carrying out of the proposed plans for the North Street, Temple Street, and Green Street sewers, would be entirely opposed to the correct plan of installing a suitable general sewerage system and sewage purification works for the entire city. The discharge of more sewage into Paint Creek in the manner proposed would result in increasing the objectionable conditions in that stream.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, the State Board of Health disapproved these plans submitted by Mr. Forest Anders, clerk of the department of public service, on May 13th, 1911, for proposed sewers for North Street, Temple Street, and Green Street, respectively.

The Board advised that the city take immediate steps toward the installation of a general sewerage system and sewage purification works, in some such manner as was proposed by the present city engineer and approved by the State Board of Health in 1902. It was thought that the plans submitted at that time could, however, be improved and made to conform with more modern standards, and for this reason they should be resubmitted to the State Board of Health for consideration, or new plans be prepared.

On July 10th, 1911, there were received from Mr. Frank M. Kennedy, city engineer, Washington C. H., plans for an improved sewerage system and sewage purification works for that city. These were referred to the engineering department and the following report submitted:

On receiving notice of the Board's disapproval, the local council authorized its engineer to at once prepare plans for constructing new sewers, on the separate system, including an intercepting sewer leading to a sewage purification works below the city. As the money for the proposed improvements must be raised by popular vote, the engineer was directed to prepare the plans only in such detail as would enable him to make an estimate of cost, and so as to clearly point out to the council and the State Board of Health the general arrangement of the sewerage system and the design of the purification works. The plans submitted are general in nature, there being no profiles nor detailed drawings of the purification works.

After the sewerage improvements have been authorized, it is further proposed, by council, to pass an ordinance requiring that all future sewers be built in accordance with the new plans, and that whenever it is necessary to repair or change the grade of any existing sewers that such sewer must be replaced by one which will conform to the new system. In this way the storm water can gradually be eliminated without creating the hardship of forcing the people to abandon or change their present sewer connections.

According to statistics recently collected, it was learned that there are at present 671 water closets in use in the city, which represents a population tributary to the sewers of 3,500 people or 50 per cent. of the total population. The water company states that the present daily consumption is 600,000 gallons, 100,000 gallons of which are used by the railroad for steam purposes. It is, therefore, believed that the dry weather flow of sewage, during the next ten years, would not be greater than 500,000 or 600,000 gallons, corresponding to the sewage from 5,000 or 6,000 people.

Proposed Sewerage System. The plans provide for a system of domestic sewers to accommodate the entire city. These sewers are principally 8 inches and 10 inches in diameter. They will be ventilated through the perforated manhole covers and will be provided with flush tanks at all dead ends. The main intercepting sewer, 22 inches in diameter, will be 1.62 miles long. This is to terminate in a pump well on the bank of Paint Creek near Elm Street, from which point the sewage will be pumped to the sewage purification works, located on land about 2,000 feet farther downstream.

For immediate construction, it is proposed to install the intercepting sewer, pumping station, and purification works; and also a number of the lateral sewers. It is proposed, for the immediate future, to connect the nine present main outlets which receive the flow of the com-

bined sewers of the city with the new interceptor in such a way that the dry weather flow of sewage will pass to the purification works, but when this flow is increased three or four times by storm water, the excess of diluted sewage will be discharged into the creek. These storm water overflows will gradually be abandoned as the new sewers are made to replace the old.

Pumping Station. The sewage from the main sewer will discharge into a pump well some 12 feet deep, from which it will be raised by centrifugal pumps driven by electric motors into a 10-inch force main, leading to the purification works. The pumps will be set in a dry pit adjoining the sewage well; and the electric motors will be on the floor above the ground level, as well as above high water in the creek. They will be protected by a suitable building. As a site for the pumping station, a tract of land of $\frac{3}{4}$ acre, adjoining the easterly side of Elm Street just north of the creek, is to be obtained.

Sewage Purification. The site proposed for sewage purification is an excellent one. It is located below the city and between Paint Creek and the East Fork of Paint Creek, just above the confluence of these streams. The city is to obtain an option on 14 acres of land, which will afford not only ample opportunity for increasing the plant, but protection against damage to the adjoining property. On the northerly side, it is bounded by the railroad, beyond which is a large cemetery. There are two houses located 800 feet northwest and west of the site, respectively, but no more within 1500 feet. It is proposed to purify the sewage by sedimentation, contact filters and final filtration through sand.

The sewage upon arrival at the works through the 10-inch force main, passes into the sedimentation tanks, which are four in number, each $12\frac{1}{2}$ feet by 50 feet, and 10 feet deep. Based on the nominal capacity of the plant, a total capacity of 200,000 gallons or eight hours' flow is thus afforded. Provision is made for using one or more of the tanks as desired. The sludge will be drained from each tank at two different points, and discharged on to a sludge bed 50 by 25 feet, conveniently located.

The settled sewage will pass to a control chamber located in the center of a group of four contact filters. These four filters are each 80 feet square and are to contain 4 feet of filtering material. The sewage is to be distributed over the surface through a system of distributors; and the effluent will be collected from the bottom and conveyed back to the control chamber through an ample system of underdrains. Assuming that the voids of the filtering material will be 33 per cent., and with the plant working at its nominal capacity (600,000 gallons per twenty-four hours), there will be $2\frac{1}{2}$ cycles per day. From another viewpoint, the tributary population per acre-foot of filtering material will be 3000 persons.

The effluent from the contact filters will be treated in intermittent sand filters, 3 feet in depth. These are two in number, each 200 by 100 feet, having a total area of nearly an acre. The discharge from each of the contact filters will serve as a "dose" for one sand filter and, on the basis of 33 per cent. voids in the contact filtering material, will theoretically distribute the sewage over the sand to a depth of 5 inches. Means are provided for directing the flow to whichever sand filter it is desired to use.

As the site of the purification works is underlaid by a deep bed of gravel ranging from coarse to fine, it is believed that contact filtering material can be obtained by screening out the coarser gravel; and that the screenings will be of proper size for use in the secondary filters. If this plan can be followed it will afford a most excellent and economical means of obtaining filtering material for both filters.

So far as possible, the purification works are to be built of concrete, including concrete walls around the filters, which will have a distinct advantage over earth embankments; as the latter require a great deal of attention and rarely retain their shape. The septic tanks and contact filters will be at such elevation that they cannot be put out of commission by floods from the creek.

As stated above, the plans for the sewage purification works are very general, containing simply enough detail to indicate what is proposed. If the project is voted upon favorably by the citizens, full detailed plans and specifications suitable for use in constructing the plant will be prepared.

ACTION OF THE BOARD.

At a meeting held July 19th, 1911, the State Board of Health approved these plans for a new sewerage system, intercepting sewer and purification works for Washington C. H., as shown on drawings submitted by Mr. Frank M. Kennedy, city engineer, on July 10th, 1911, upon the following conditions:

1st. That before any contracts for construction are let detailed designs of the overflows to be used at the connections between the existing combined sewers and the new interceptor be submitted to and receive the approval of the State Board of Health;

2nd. That before any contracts for construction are let detailed plans of the pumping station and purification works, including the plans for controlling devices, be submitted to and receive the approval of the State Board of Health;

3rd. That samples of all filtering material be submitted to and receive the approval of the chief engineer of the State Board of Health before being placed; and,

4th. That this approval be void unless construction is begun before January 1st, 1913.

REPORT UPON PROPOSED STORM WATER SEWER FOR WEST LAFAYETTE.

On May 27th, 1911, there was received from Mr. R. E. Hamilton, consulting engineer for West Lafayette, plans for a storm sewer. These were referred to the engineering department and the following report was submitted:

West Lafayette is a village of about 1,100 population, located in the eastern part of Coshocton County in the valley of the Tuscarawas River.

The proposed plans provide for a storm water sewer having a total length of 8,300 feet, consisting of vitrified pipe ranging in size from 18 to 30 inches in diameter and terminating in 2,800 feet of open ditch. The ditch enters the Tuscarawas River about $1\frac{1}{2}$ miles from the central portion of the village. The estimated cost of the sewer is \$17,000.

The sewer is intended to drain storm water from about 200 acres of the village territory and is designed on the basis of a 2-inch per hour rainfall with a $\frac{1}{8}$ -inch runoff.

From the plans and accompanying application, there is apparently no intention of using the storm water sewer for sanitary wastes of any kind, and, furthermore, the installation of a separate sanitary system as well as water works has been in the past year definitely contemplated.

ACTION OF THE BOARD.

At a meeting held July 10th, 1911, the State Board of Health approved these plans upon the following conditions:

1st. That before constructing the sewer, council pass and provide for the enforcement of an ordinance prohibiting the use of this sewer for household wastes or domestic sewage of any kind, and that a copy of this ordinance be filed with the State Board of Health; and,

2nd. That this approval be void unless construction is begun before January 1st, 1913.

The authorities were also advised that, realizing the dangers arising from the use of storm water sewers for sanitary purposes the Board would emphasize the importance of carefully looking after the enforcement of their ordinance, which is to prevent the use of storm sewers for sanitary purposes.

On August 11th, 1911, plans were received from Mr. R. E. Hamilton, engineer for the village of West Lafayette, showing a proposed change in the outlet of the proposed storm sewer system. These plans were referred to the engineering department and the following report was submitted:

The plans received from Mr. Hamilton on August 11th, 1911, show a proposed change in the outlet of the proposed storm sewer, the change being necessary because of inability to secure the right of way over the proposed route. The new plan provides for a change in route below Main Street. Starting about 500 feet east of the sewer as originally planned, the new route extends directly north to an outlet in the Tuscarawas River at a point about $\frac{3}{4}$ mile above the old outlet.

As now planned, the sewer will have somewhat better grades than that of the original route, the minimum grade of the new sewer being about 0.214 per cent. The proposed sewer will also have the advantage of being constructed of vitrified pipe all the way to the outlet, the open ditch being eliminated. The pipe will be 30 inches in diameter to the outlet, the same as provided in the original plans.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, the State Board of Health approved these plans submitted August 11th, 1911, showing proposed modifications in the plans approved July 19th, 1911.

REPORT ON PROPOSED SEWAGE PURIFICATION FOR WILMINGTON.

On October 14th, 1911, plans were submitted by The Riggs and Sherman Company, Toledo, consulting engineers for Wilmington, for a proposed sewage purification plant. After reviewing the plans the following report was submitted:

Wilmington is located in the central part of Clinton County, of which it is the county seat. The area of the village within the corporation limits is 2.75 square miles. The topography of the village site is rolling, and the surface drainage flows into Lytles Creek and two of its tributaries which pass directly through the built up portion of the village.

The public water supply of the village has been in general use for a number of years and has encouraged the installation of modern plumbing. Owing to the absence of an adequate system of sewers, sewage and other putrescible wastes have been discharged into Lytles Creek and its tributaries and have resulted in a gross nuisance. The small flow in this creek necessitates purification works in connection with the new sewers.

SEWERAGE SYSTEM.

General plans showing the location and sizes of sewers, including a proposed site for the sewage purification plant, were submitted on August 8th, 1911, following the receipt of which an inspection was made

for the purpose of ascertaining the suitability of the disposal site. Subsequent to the above inspection the consulting engineers were informed that the proposed site was objectionable owing to its proximity to habitations, and it was recommended that a site farther removed from the built up portion of the village be selected. This recommendation was carried out and a site selected in the southwestern portion of the village 2,000 feet southwest of the fair grounds and well removed from habitation.

The sewerage system is to be built on the separate plan. The entire system comprises approximately 20 miles of vitrified pipe sewers laid with well cemented joints. It ranges in size from 8 to 20 inches. The main trunk sewer leading to the purification works is 24 inches in diameter. Manholes are shown at all changes of grade and direction and are not farther apart than 500 feet. Flush tanks are to be placed at all dead ends. All of the sewers are laid on ample grade and will be ventilated by means of perforated manhole covers and house vents.

SEWAGE PURIFICATION PLANT.

Quantity of Sewage to be Treated. The sewage purification plant is designed to meet the demands of the village for a period of 25 years. Based on the past growth of the village, the population at the end of this period is estimated to be 8,000. The quantity of sewage immediately expected is 200,000 gallons, based on the present water consumption. The quantity of sewage for which the plant is designed is 300,000 gallons per day, based on a tributary population of 4,000, at a rate of 75 gallons per capita. The number of connections which will be made immediately is estimated to be 830. Little, if any, manufactural wastes will enter the sewers.

General Features. The main features of the sewage purification works comprise a screen chamber; pumping station; sedimentation tanks; dosing chamber equipped with automatic dosing apparatus; and four intermittent sand filters. The low grade of the trunk sewer leading to the purification works was necessitated owing to the low level of the sewers in the south district, in view of which the sewage will have to be pumped a total height of 36 feet before sufficient head is available to pass it through the plant by gravity.

The treated sewage will be discharged into Lytles Creek through a 24-inch outlet placed one foot above the bed of the stream. Provision is made to by-pass the sewage directly to the creek during flood stages.

Screen Chamber. The screen chamber is elliptical in plan and is divided into two compartments, each having an average width of 3 feet and a total length of 11 feet 3 inches. Provision is made for diverting the flow into either compartment by means of stop planks. Each compartment is provided with two screens. The first, or coarser screen,

will have open spaces of $1\frac{3}{4}$ inches, and the second, or finer screen, will have open spaces of $\frac{3}{4}$ inches. Both screens are constructed of $\frac{1}{4}$ by 1 inch wrought iron bars.

Pump Well. Adjacent to the screen chamber will be located a pump well having an inside diameter of 30 feet and a total depth of 16 feet 6 inches, with a depth to the flow line from the screen chamber of 10 feet 3 inches. The well is built of 13-inch brick walls with 6-inch concrete cover and bottom. The sewage is discharged from the pump well to the sedimentation tanks through an 8-inch cast iron pipe by means of a vertical centrifugal pump connected to a 10-horse power motor. The pump, which is located 4 feet above the bottom of the pump well, has a nominal capacity of 735 gallons per minute. The pump house will be a brick structure, $13\frac{1}{2}$ by $9\frac{1}{2}$ feet in plan.

Sedimentation Tanks. There will be two sedimentation tanks combined in one structure, thus permitting elasticity of operation. The tanks are 95 feet long inside, one 16.4 feet wide, and one 10.8 feet wide, with an average depth of 10 feet, thus making the total capacity 184,800 gallons, or a period of flow of 15 hours, based on a daily flow of 300,000 gallons. It will be noted that the tanks are rather long in proportion to their width; however, it is thought that the velocity of flow will not be such as should prevent efficient sedimentation. Hanging baffles are provided at 28-foot intervals for the purpose of breaking up longitudinal currents and distributing the flow across the width of the tanks. The inlet to the sedimentation tanks is through a receiving basin, 5 feet 6 inches by 2 feet 6 inches in plan, the flow at this point being controlled by two 15-inch shear gates. The sewage after passing through the tanks discharges over a weir into an outlet channel, which in turn discharges through a 12-inch cast iron pipe to the dosing tank. The bottom of the tank is hopper-shaped, with a total fall of 3 feet in 95 feet toward the outlet. This feature of having the bottom of the tank slope toward the outlet, though possibly conducive to the ready removal of sludge in this case, is objectionable, in view of the fact that the accumulation of sludge in the inlet end of the tank tends to reduce the cross section. It is also probable that solids deposited in the tank at this point will be stirred up by a temporary increase in the velocity of flow. The tanks are covered with a 6-inch reinforced concrete roof supported by concrete beams, 6 inches by 18 inches in section. The walls and bottom of the tank are constructed of reinforced concrete.

Dosing Tank. The dosing tank will have a capacity to drawing depth of siphons of 32,000 gallons, or a period of flow of 2 hours and 40 minutes. The above capacity of the tank will cover one sand filter to a depth of $1\frac{1}{2}$ inches. The contents of the dosing chamber will be discharged on to the filters by means of four 10-inch Miller siphons, which operate alternately. The dosing tank and siphons are housed in a brick structure, 12 by 14 feet in plan.

Sand Filters. There will be four sand filters, each having an area of 0.6 acre. Based on the rate of flow for which the plant is designed, the rate of filtration will be 125,000 gallons per acre per day. The filter beds will be enclosed by earth embankments having slopes 1.5 to 1. The sand layer will have a minimum thickness of 3 feet, but is not to be underlaid by gravel. The sewage will be applied to the surface of the filters through a system of galvanized iron distributing troughs. These troughs are 12 inches deep, with variable width, based on the velocity of flow. The arrangement of the trough distributors as shown on plans should give a uniform distribution over the beds. However, it is thought that the galvanized iron is not sufficiently durable to warrant its use. The underdrains consist of 6-inch vitrified pipe, placed in parallel rows, 10 feet center to center.

Sludge Bed. The sludge from the sedimentation tanks will be discharged on to a sludge filter, 100 feet by 150 feet in plan, giving it a total area of 0.35 acre. The filtering material will consist of 3 feet of sand, undrained by parallel lines of 6-inch vitrified tile laid 10 feet apart center to center and tributary to a 15-inch collecting line. The sludge will be discharged on to the bed through a wooden trough placed at one end.

ACTION OF THE BOARD.

At a meeting held November 21st, 1911, the Board considered the plans for sewerage and sewage purification for Wilmington, as shown on drawings submitted by The Riggs and Sherman Company October 14th, 1911.

These plans were approved upon the following conditions:

1st. That the sewage purification plant be completed before any of the proposed sewers are placed in use;

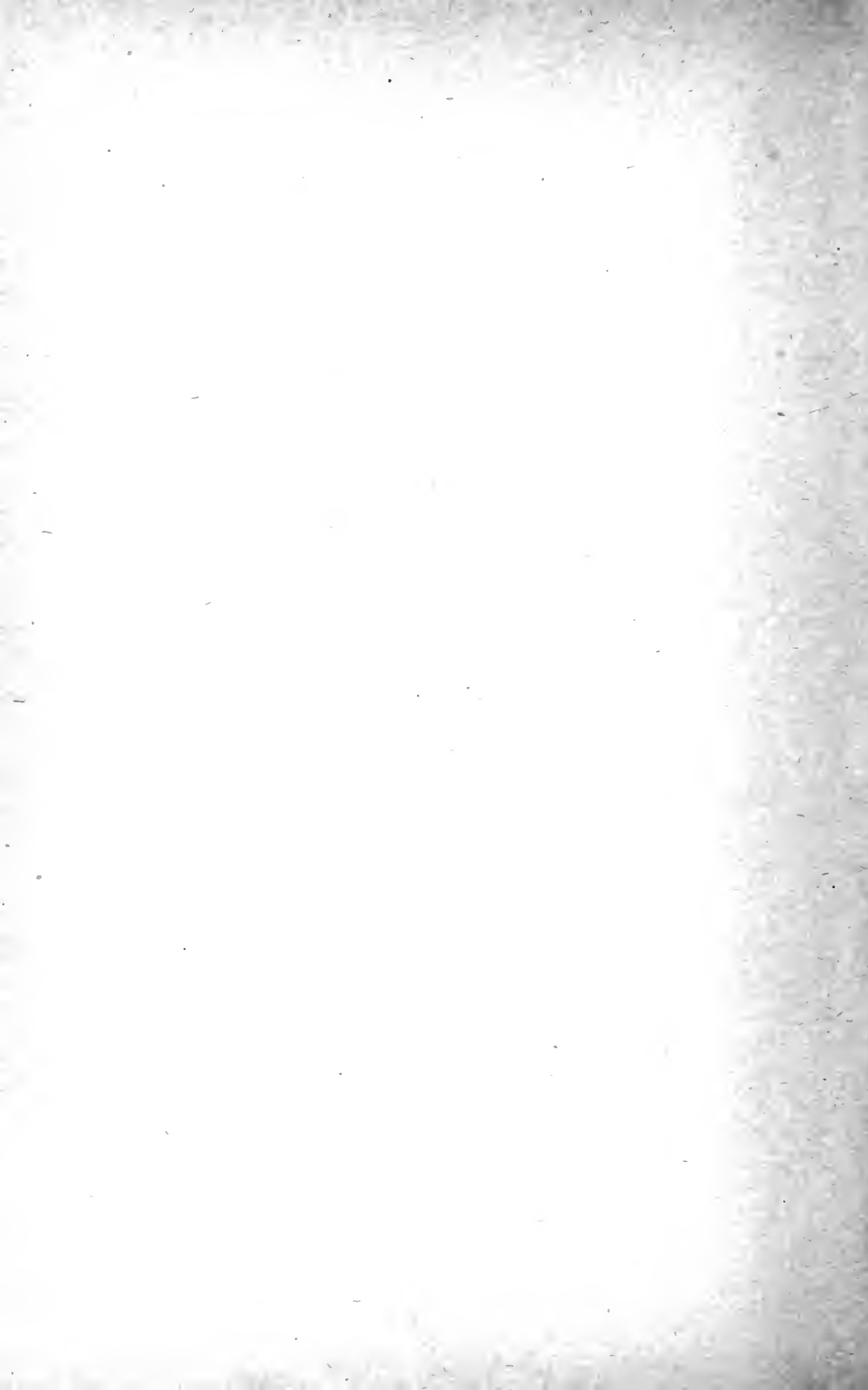
2nd. That the plant be enlarged whenever in the opinion of the State Board of Health such enlargement becomes necessary;

3rd. That the village council provide for the appointment of a sewer superintendent, and specify that he shall have responsible charge of the sewer system and sewage purification works; and that a certified copy of the ordinance providing for the appointment of such a superintendent be filed with the State Board of Health before the letting of any contract for construction work;

4th. That the sand bed be underlaid with a suitable layer of gravel, and that all samples of filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

5th. That this approval be void unless construction of sewage purification works is commenced before January 1st, 1913.

The attention of the consulting engineers was called to the fact that the form of sedimentation tanks in their plans was not in accordance with what is considered best practice and that such tanks should be made deepest at the inlet end.



INVESTIGATIONS UNDER THE BENSE ACT

(99 Ohio Laws, Page 74, Sections 1249-1261 inclusive, General Code.)

(351)

REPORT ON THE POLLUTION OF JENNINGS CREEK AND
THE AUGLAIZE RIVER AT AND NEAR DELPHOS
WITH SPECIAL REFERENCE TO THE DISPOSAL
OF ACID PICKLING LIQUORS FROM THE
DELPHOS MANUFACTURING COM-
PANY'S PLANT.

On October 5th, 1908, a petition was received from the clerk of Ft. Jennings, Putnam County, and also a similar petition from the clerk of Jennings Township, Putnam County, with reference to the pollution of Jennings Creek and the Auglaize River, alleged to be caused by the sewage of the village of Delphos. This petition was referred to a committee of the Board, which filed a report on December 5th, 1908. The committee found that there existed a decided nuisance due to the imperfectly treated sewage from the village of Delphos, and especially the presence of acid iron wastes in the sewage which when discharged from the settling tank caused a marked discoloration of Jennings Creek and the Auglaize River. They recommended that the village take steps to prohibit the discharge of acid iron wastes into the sewers.

May 25th, 1909, one of the assistant engineers visited Delphos and Ft. Jennings with a view to learning whether the recommendations of the Board had been carried out, and also to investigate the pollution of Jennings Creek and the Auglaize River. It was found that the recommendations of the Board relative to the disposal of acid iron wastes had not been carried out and that the streams were seriously polluted by the discharge of acid iron wastes into them. As a result of this investigation, on June 16th, 1909, the State Board of Health voted, (1) that the council of the village of Delphos be notified that they would be expected to pass an ordinance directing The Delphos Manufacturing Company to remove its acid iron wastes from the village sewers on or before October 1st, 1909, or to install a satisfactory plant of its own for purifying its wastes before that date; (2) that the council be further notified that in case of failure on their part to pass and enforce such an ordinance as above mentioned, further procedure will be taken by the State Board of Health under the Bense Act to compel the village of Delphos to construct a plant to purify all the sewage which is being discharged through the village sewers, including the acid iron wastes from the Delphos Manufacturing Company."

In 1909 the contract for the construction of a copperas recovery plant was awarded by the company but some unavoidable delays were occasioned in the construction of the plant and it was not placed in operation until about April 1st, 1910.

June 9th and 24th, 1910, one of the assistant engineers visited Delphos for the purpose of investigating the operation of the copperas re-

covery plant, and also the pollution of Jennings Creek and the Auglaize River, and following is his report:

The Delphos Manufacturing Company, located in the southeastern portion of the village of Flat Rock Creek, is engaged in the manufacture of galvanized roofing, pipes, oil cans, tanks, etcetera. The process of manufacture consists in pickling sheets of black iron, which are usually received in a rusty condition; rinsing the pickled sheets; cleaning in a so-called feeding tank; galvanizing by passing through a galvanizing pot; and subsequent forming of the ware. In the pickling process the sheets are immersed in a warm solution of sulphuric acid having a strength of about one part of H_2SO_4 (60 deg. Baumé, 1.652 sp. gr.) to ten or twelve parts of water. The pickling liquor is contained in a vat about 13 feet long, $2\frac{1}{2}$ feet wide, and $4\frac{1}{2}$ feet deep, and the liquor is kept in a constant state of agitation by means of a plunger extending along one side of the tank. The pickling process requires thirty to forty minutes, after which the sheets are removed from the pickling vat, placed in a similar vat containing clean water, and thoroughly rinsed to remove any adhering acid. After rinsing, the sheets are placed in a so-called feeding tank which contains a dilute solution of muriatic acid having a strength of about one part HCl (20 deg. Baumé, 1.152 sp. gr.) to fifty parts of water. From the feeding tanks the sheets are passed through the galvanizing pots.

The wastes from The Delphos Manufacturing Company consist of (1) the spent pickling liquor, of which 3,500 to 4,000 gallons are produced daily and from which the copperas is recovered; (2) the rinsing liquor, which flows in a constant stream from two rinsing tanks and which contains small amounts of acid iron waste; (3) waste liquor from the feeding tank, of which about 1,200 gallons are produced in twenty-four hours; this liquor contains ferric chloride in solution and a small amount of free hypochloric acid; (4) cooling water from a large gas engine which operates the plant, and from the crystallizers. The waste liquors from the rinsing tank and feeding tank, and the cooling water, as well as various other wastes about the plant, are discharged directly into the Delphos sewers.

Description of Copperas Recovery Plant. The spent pickling liquors, which contain about nineteen per cent. of copperas and small amounts of free sulphuric acid, have been the principal cause of complaint against the pollution of Jennings Creek and the Auglaize River. In order to dispose of this waste, a copperas recovery plant of the type patented by the American Steel and Wire Company was installed. It was built under the supervision of the Summit Engineering Company of Pittsburgh, at a cost of \$20,000, of which the village of Delphos paid \$4,000.

The liquor from the pickling vats is discharged into a receiving well at the end of each day's run. This well is 20 feet in diameter and 8 feet

deep below the inlet, and has a capacity of 18,000 gallons. While the liquor remains in this tank, it is partially neutralized by means of scraps of black iron which are placed on the bottom. The liquor is pumped from the receiving well as it can be handled and treated in the recovery plant. The recovery plant consists of two neutralizing tanks constructed of 4-inch fir, each having a capacity of 5,000 gallons; a settling tank into which the neutralized liquor is discharged from the neutralizing tank and settled for a few hours before filtering; two mechanical filters; a storage tank into which the filters discharge; a double effect evaporator; a crystallizer; a moisture extractor; and a continuous steam drier. The neutralizing tanks are provided with false bottoms on which are placed scraps of black iron which are acted upon by the free acid contained in the liquor. A steam coil is used to heat the liquor and promote the action of the acid. Neutralization takes place in about forty-eight hours in the old tank which is provided with but one false bottom in the lower portion, and in thirty-six hours in the new tank which is equipped with a second false bottom at about half depth. The filters which are used to remove any suspended matter in the liquor are each 4 feet in diameter and have a thickness of filtering material of 18 inches, which consists of 6 inches of $\frac{1}{2}$ -inch gravel, 6 inches of $\frac{1}{4}$ -inch gravel, and 6 inches of coarse sand. The filter effluent flows by gravity through the storage tank and into the evaporator, where it is thickened to about 42 deg. Baumé (1.382 sp. gr.). The crystallizer is 9 feet in diameter and $4\frac{1}{2}$ feet high, constructed of boiler plate and open at the top. The liquor is cooled to incipient crystallization by means of three coils of copper pipe through which cold water is pumped. The wet sugar formed in the crystallizer is dropped into a centrifugal machine and the moisture removed. This liquor which is not crystallized is returned to the receiving well. The sugar is passed through the continuous steam drier, screened, and stored for shipment.

When the recovery plant was first installed, it was provided with a single neutralizing tank having a capacity of about 5,000 gallons. It was thought by the engineer designing the plant that this would be ample to care for the wastes produced, but it was found that neutralization was not completed until forty-eight hours after the tank had been filled. It was therefore necessary to dispose of that portion of the spent pickling liquor which could not be neutralized, by pumping them from the receiving well on to the surface of the ground at the plant. Whenever this was done a large volume of wastes flowed into Flat Rock Creek nearby and ultimately into Jennings Creek by means of the city sewers through a connection to them from Flat Rock Creek. The county commissioners are at present improving the channel in Flat Rock Creek and a dam has been constructed to temporarily divert the entire flow into the Delphos sewers. The officials of The Delphos Manufacturing Company have realized that this intermittent discharge of acid iron

wastes into Flat Rock Creek creates almost as serious a nuisance as existed before the recovery plant was installed, and on June 18th, 1910, a second neutralizing tank was added to the equipment of the plant. The present total capacity of the two neutralizing tanks should be sufficient to make possible the handling of all the spent pickling liquors produced. Since the addition of the second neutralizing tank, all spent pickling liquors have been disposed of by means of the recovery plant.

Pollution of Jennings Creek and Auglaize River. On June 9th, 1910, in company with officials of the village and of The Delphos Manufacturing Company, the writer inspected the condition of Jennings Creek from the point of discharge of the village sewers to its confluence with the Auglaize River, and the Auglaize River from that point to about one-fourth mile below Ft. Jennings. The sewers at this time were receiving the diverted flow from Flat Rock Creek through the connections before described. The flow of Flat Rock Creek was very small and consisted principally of wastes received from The Delphos Manufacturing Company, a large hoop mill, and a creamery. At the sewer outlet it was noted that the effluent from the settling tank carried a large amount of suspended matter which was diffused through the creek water, giving it a muddy reddish color. The general condition of Jennings Creek was found to be practically as described by Mr. Kimberly in his report of an investigation made May 25th, 1909, before the recovery plant had been installed. The flow of the stream was very small, and the iron sludge which was noted in large quantities along its course was but slowly removed. At the confluence of Jennings Creek with the Auglaize River there was no apparent velocity in the creek. The water was very red and apparently heavy sludge deposits had formed near the mouth of the stream. The creek water and the sludge deposits are slowly carried away by the river, which was discolored from this point to Ft. Jennings. About one-fourth mile below Ft. Jennings, the river presents a clean appearance. The water was not noticeably discolored, and no sludge deposits were noted in the stream.

On June 24th, 1910, a second inspection was made along Jennings Creek from the sewer outlet to a point about half way to Ft. Jennings. At this time conditions were found to be about the same as on June 9th. The last discharge of acid iron wastes into Flat Rock Creek had occurred on June 18th, and its effect was still apparent in Flat Rock Creek and at the sewer outlet.

SUMMARY.

An inspection of the present conditions at Delphos shows that the order of the State Board of Health of June 16th, 1909, under the Bense Act, has been carried out by the village officials and by The Delphos Manufacturing Company to the best of their ability. The continued pollution of Jennings Creek and the Auglaize River which has occurred

since the copperas recovery plant has been installed has been brought about by the inadequate capacity of the neutralizing tank as it was first installed. Owing to the inability of the plant to treat all of the spent pickling liquor produced, it has been necessary to pump intermittently rather large volumes of the liquor into Flat Rock Creek, from which it flowed ultimately into Jennings Creek. The low stage of Jennings Creek which has existed for a month or more, has intensified the degree of pollution. Even with no further discharge of acid iron wastes into the creek, its condition will remain objectionable until its channel is cleaned by a freshet. With the additional neutralizing tank, the present equipment should be sufficient to make possible the treatment of all the pickling liquors produced, and no liquid waste should result from the process. The rinsing liquors and muriatic acid iron wastes will continue to flow into the village sewers, and it remains to be determined whether or not these wastes will interfere with the regular action of the settling tank or cause a nuisance in Jennings Creek.

In March, 1911, complaint was again made of the pollution of Jennings Creek. At a meeting of the Board held April 21st, 1911, the matter was referred to Mr. Hill, member, and Mr. R. Winthrop Pratt, chief engineer, as a committee. This committee decided to postpone action until the constitutionality of the Bense Act was established, but later decided that the chief engineer should make an inspection and obtain evidence for future use.

After inspection, May 4th, 1911, the chief engineer reported that investigation showed that there was still cause for complaint, not only on account of the discoloration of the stream due to the discharge of rinse water from The Delphos Manufacturing Company through the city sewers, but also on account of gas works wastes which were being discharged through a public storm sewer into Flat Rock Creek, a tributary to Jennings Creek.

In order to gain more information as to the exact source of the iron waste pollution, samples were collected and the analyses showed conclusively that the discoloration was due to the discharge of rinse water into the city sewers by The Delphos Manufacturing Company.

The city officials were notified that the city was responsible for the pollution caused by the material discharged through the existing sewers, and it was suggested that they interest themselves in determining the cause of the present discoloration.

The Delphos Manufacturing Company has spent considerable money in the construction of a copperas recovery plant which purifies the greater portion of the wastes, but it does not treat the rinse water as the latter is considered to be too dilute to be economically handled.

The chief engineer made the following statements:

Referring to the pollution of the stream by domestic sewage from the existing plant, this has not yet become sufficiently serious to be complained of. The presence of iron or copperas in the sewage has a certain purifying effect upon the organic matter, in spite of the fact that it causes a discoloration. It is probable that in the near future conditions will warrant the enlargement of the sewage plant whether or not the iron is removed from the sewage.

The other cause of complaint is due to the discharge of wastes from the gas works into Flat Rock Creek through one of the city storm water drains; and the city is, therefore, responsible for this pollution. In view of the recent decision of one of the circuit courts of this state against the constitutionality of the Bense Act, the Attorney General has advised that the Board take no action based on this law until its constitutionality has been established by the Supreme Court. It would seem, therefore, that nothing more can now be done in answer to the original Bense Act complaint of 1908.

There might be a possibility that under the terms of the original approval of the sewer system in 1904, the Board could legally force the city to enlarge and redesign its sewage disposal plant with reference to taking care of the iron wastes.

In regard to the recent petition submitted to the Governor, by citizens of Jennings Township, it would seem that the petitioners could most easily secure relief through the local courts, in which case the evidence which has been secured by the State Board of Health would be available to them.

At the meeting of the State Board of Health, held July 19th, 1911, Mr. Hill presented this report of the chief engineer, endorsing his conclusions with the further suggestion that the citizens of Jennings Township, who had petitioned the Governor for relief, be advised by the Secretary of the Board to file an action in the Common Pleas Court of Allen County against the village of Delphos, petitioning the village to abate the cause of complaint, all of which originates within the jurisdiction of the village.

REPORT ON THE PUBLIC WATER SUPPLY AT EAST LIVERPOOL.

INVESTIGATION OF THE WATER SUPPLY UNDER THE BENSE ACT.

Under date of March 17th, 1910, the following resolution was received from the board of health of East Liverpool:

"WHEREAS, the city of East Liverpool, Ohio, is securing its water supply from the Ohio River, which is described by the State Board of Health as an 'open sewer,' and

WHEREAS, the use of said water without purification is a menace and detrimental to public health, and

WHEREAS, there is an immediate necessity for the improvement of our water supply, and

WHEREAS, after years of agitation, legislation and litigation our city officials are unable to agree on a solution for the purification of our water supply, Therefore be it

RESOLVED, that the State Board of Health be requested to investigate our sources of supply and take such proceedings as will be necessary to bring about a safe water supply for our citizens, and be it further

RESOLVED, that the clerk of the board of health is hereby directed to send a copy of this resolution to the State Board of Health.

(Signed) C. H. DAVIDSON,
Clerk of the Board of Health, East Liverpool, O."

Resolution adopted March 12, 1910.

The president of the Board appointed as a committee to make the investigation requested in the above resolution, Mr. Josiah Hartzell, member, and Mr. Paul Hansen, acting chief engineer. This committee visited East Liverpool on April 8th, 1910, and in company with the mayor, director of public service, members of council, members of the board of health, and city engineer, inspected the existing water works, sites proposed for the location of new water works and the general sanitary conditions of the city. The following report was submitted:

East Liverpool is a city of about 25,000 population, located on the Ohio River in Columbiana County and bordering on the Pennsylvania state line. The water works were installed in 1879, at which time a pumping station was built on the bank of the Ohio River above local pollution from the main portion of the city, and direct intakes were laid to the main channel of the stream. In addition, reservoirs were built which permitted a period of several days' sedimentation before the water was delivered to consumers. These water works have been in use as originally constructed to the present time, though of course various additions and extensions have been made. It has long been realized that the public water supply is not of satisfactory quality from a sanitary point of view, and there has been an agitation among the citizens of East Liverpool in favor of the introduction of a new or improved supply that will be suitable for all domestic purposes.

The Ohio River at the point of intake is considerably contaminated by communities on the stream above. Principal among these communities are those comprised in what is known as the Pittsburg district with a population of approximately one million persons. Pollution from this source enters at points varying from 30 to 45 miles above East Liverpool. Another important source of contamination is the group of communities comprising a population of about 35,000 and located on and near the mouth of Beaver River, which river enters the Ohio about 16

miles above East Liverpool. Aside from these main centers of pollution are numerous smaller towns lying on both banks of the river. Some of these towns have sewerage systems while others have not. All, however, contribute more or less contamination of an objectionable character.

Perhaps the most dangerous source of contamination is from East Liverpool itself. That section of the city known as the East End lies entirely in an upstream direction from the water works intake. While this district is not systematically sewered, great quantities of sewage and other highly objectionable wastes are discharged into several streams passing through its thickly built up portions and thence into the river but short distance above the water works intake. Aside from the menace to the quality of the public water supply, the East End should be properly sewered in order to promote general sanitation and do away with the disease breeding conditions which now exist.

Notwithstanding the large amount of contamination that reaches the Ohio River above East Liverpool, the analysis of numerous samples does not indicate a grossly contaminated water. This is probably due to the effect of mine drainage and acid iron wastes which enter the stream and its tributaries and cause during periods of medium or low stage a high degree of self-purification and clarification. The water in fact is one which is readily amenable to treatment by ordinary standard filtration methods. The purification effected is not, however, sufficient to prevent an excessive typhoid fever death rate as is evidenced by the accompanying table of vital statistics. A much greater degree of safety would undoubtedly be rendered if the water works intake were placed above all local pollution. The character of the water is represented by the accompanying table of analyses, which embodies all analyses that have been made in the laboratories of the State Board of Health of water taken from the river directly and from taps on the mains. It will be observed from the averages that the river is somewhat improved by passage through the reservoirs. However, the daily consumption of water is at present so great that the sedimentation in the reservoir cannot long continue to be in any degree effective.

What has been said in favor of the water as drawn from the Ohio River at East Liverpool should not be taken to indicate that the water is by any means a safe supply but merely that it is amenable to purification. It is, therefore, apparent that an improved water supply is decidedly necessary and should be installed at the earliest possible date in order to protect the health of the inhabitants.

There are a number of ways in which a satisfactory water supply can be obtained. Principal among these in this section of the country are wells; infiltration systems; and from streams containing not more than a moderate amount of contamination, with subsequent purification,

The best system for any particular community depends entirely on local conditions.

Many citizens of East Liverpool have felt that a satisfactory supply should be available from wells. The feasibility of such a source has been emphasized by the fact that certain of the industrial concerns have found well supplies which yield an apparently abundant quantity of water. While not wishing to eliminate well supplies as a possibility, it may be said that well water from any available formation in the vicinity of East Liverpool is likely to prove objectionably hard and further undesirable because of an excessive iron content. Moreover, it is not likely that water from wells can be found in sufficient quantities for a public supply, notwithstanding the experience of some industrial concerns. This latter objection to a well supply was in part demonstrated by a number of test wells which were sunk on Babb's Island near its western extremity. It may be pertinent to remark at this point that there is a great lack of conception in the popular mind of the quantity of water necessary to meet the demands of a public water supply for a community like East Liverpool. Whereas a few hundred thousand gallons per day will furnish all the needs of one of the great manufacturing concerns, there is necessary for the entire city at least five million gallons per day, and it is probable that within the course of a comparatively few years the quantity necessary will be more than double this figure. No source of supply should be developed unless it gives reasonable promise of meeting the needs of the city for at least 20 to 30 years in the future. However, if available in proper quantity and quality, a well supply cannot be excelled in simplicity, reliability, and cheapness.

Again, there is the infiltration system. This system seems at the present time to make the strongest appeal to popular favor, and it must be said that if suitable sand and gravel deposits can be found in the bed of the Ohio River within reach of East Liverpool, this system may prove a solution for the problem. It should be pointed out, however, that along the Ohio River there are a number of cribs, galleries, shallow wells, and other devices for obtaining water from the bed of the river by infiltration, most of which have proved unsuccessful in securing a water thoroughly satisfactory from a sanitary point of view. A number have succeeded in obtaining a well clarified water, while a few of these installations actually yield a water that meets all sanitary demands. On the other hand, these systems are not as inexpensive as would at first seem. There has been one notable case, at any rate, where such a system was installed at a cost which would have purchased a thoroughly reliable filtration plant and which has proved a failure. Furthermore, the exact conditions which will favor the proper operation of an infiltration system are difficult to determine by any preliminary investigations, so that even at best the success of an infiltration system is in a degree problematical.

Purification of the Ohio River water by filtration is entirely feasible and the results of the operation of a plant can be predicted with certainty, provided of course that the city places in charge of the plant a competent superintendent. Nevertheless, filtration has its objections in the cost of operation, which roughly would amount to about \$5.00 per million gallons, not including the first cost of the plant. Again, as already hinted, the success of the plant depends in large measure on the personal equation of the superintendent, but with modern design this personal equation may be reduced to a low minimum. The method of filtration adaptable to the Ohio River water at East Liverpool in undoubtedly so-called mechanical filtration, which is the only method capable of coping successfully with the high turbidities that frequently obtain.

From the statements in the foregoing, it is plainly evident that none of the suggested methods of securing an improved water supply is without its objections or without its points of advantage, and it is believed by the undersigned that a solution of the problem satisfactory to all of the intelligent citizens of East Liverpool cannot be worked out until there is available more information based on thorough engineering investigations. In short the situation at East Liverpool presents so many phases that the final decision must rest on data obtained and interpreted by an expert. Therefore, in order to reach some unanimity of opinion among the responsible officials as well as interested tax payers of East Liverpool as to the most feasible proposition for improving the public water supply of the city, there should be employed a consulting engineer, or commission of consulting engineers, specially fitted by training and experience to investigate the fundamental problems involved in water supply development, and the engineer so employed should be instructed to fully consider every reasonable possibility that has been suggested. Such an investigation should in any event include searching studies of the following: (1) Ground water conditions near East Liverpool, with a view to the development of a ground water supply. (2) Various sand and gravel bars in the bed of the Ohio River, with a view to developing some form of infiltration system. (3) The various sources of local pollution of the Ohio River, with a view to the introduction of a filtered supply to best advantage respecting the location of intake, pumping station, and filtration works.

CONCLUSIONS AND RECOMMENDATIONS.

In the light of the foregoing your committee concludes that the present public water supply of East Liverpool is dangerously contaminated and a menace to public health, and it would therefore make the following recommendations:

1st. That on or before June 1st, 1910, the city of East Liverpool be required to engage the services of a competent expert or commission

of experts, satisfactory to the State Board of Health, to make a thorough study of all possible projects for improving the public water supply; the results of such studies to be embodied in a full and comprehensive report.

2nd. That the report submitted by the expert or commission of experts serve as a basis for further action by the State Board of Health.

ACTION OF THE BOARD.

At a meeting held April 20th, 1910, the State Board of Health after considering this report found that the public water supply of East Liverpool was dangerously contaminated and a menace to public health, and instructed the Secretary to send a copy of the report to the mayor and council and to state that they would be required to engage the services of a competent expert or commission of experts, to make a thorough study of all possible projects to be embodied in a full and comprehensive report to serve as a basis for further action.

April 28th, 1910, council passed a resolution authorizing the director of public service to employ an expert commission to make this investigation.

In May, 1910, a commission of engineers, C. E. Miller of Pittsburg; J. Rich. Kommer of Pittsburg; and J. P. Leaf of Rochester, Pennsylvania, organized and on February 16th, 1911, a copy of the report made to the director of public service of East Liverpool was furnished the State Board of Health, in which the following recommendations were made:

- 1st. That the waters of the Ohio River be taken as the source of supply.
- 2nd. That the new pumping station be erected upon the thirty-eight (38) acre site owned by your city, and equipped in accordance with the description given under the head of Pumping Station and the plans submitted herewith.
- 3rd,* That a mechanical or rapid type of filter, in connection with a sedimentation basin and two (2) coagulating tanks, be constructed in substantial accordance with the accompanying plans and the foregoing description under the head of Filtration.
- 4th. That extensions be made to the distributing system in the various districts enumerated, including standpipe, equipment and pumping station, as shown on general plan.
- 5th. That a suitable site be selected and the ground secured in the near future, for the construction of a reservoir whenever additional storage may become necessary.
- 6th. That the foregoing installations, as recommended, be made as soon as it is practicable to do so.

(*Mr. Leaf's exception to this recommendation follows:

Natural filtration, when efficient and under control being is the most desirable process of water purification and its cost of operation little greater than pumping direct from the river.

I am of the opinion that a suitable supply of clear, wholesome water can be obtained from the gravel bar extending along the entire front of your new

property by placing in the gravel under the bed of the Ohio River an improved infiltration crib system.

The State departments of health of Ohio and Pennsylvania are wisely spending large sums of money in purification of the streams, thus insuring at least the present quality of the raw water in the Ohio River.

A mechanical filter being a natural sand filter with the addition of chemicals for the purpose of clarification, I am of the opinion that a natural filtration would give a water equal to a mechanical filter at one-half of the cost of installation and annual operating cost of at least \$6,000.00 less.

Recommendation:

I, therefore, recommend that an improved infiltration crib system be installed in accordance with plans submitted.)

PROPOSED NEW WATER SUPPLY.

On February 17th, 1911, Mr. C. V. Beatty, director of public service of East Liverpool, together with the city's consulting engineer, Mr. J. N. Chester of Pittsburg, submitted plans for proposed new water supply for East Liverpool. These plans were referred to the engineering department and the following report was submitted:

Under the direction of the commission, four test wells were placed in the river about two miles above the present water works and above all local pollution from the city. The depths of the wells and the materials penetrated are as follows:

<i>Formation Penetrated.</i>	<i>Depth to Bottom of Formation.</i>
<i>Test Well No. 1.</i>	
Very fine river sand.....	4 feet
Coarse sand and gravel.....	37 "
<i>Test Well No. 2.</i>	
Very fine river sand.....	4 "
Coarse sand and gravel.....	31 "
<i>Test Well No. 3.</i>	
Sand and gravel	16 "
Coarse sand	2 "
<i>Test Well No. 4.</i>	
Coarse gravel (cased the entire depth).....	29 "

Pumping tests were made on these wells, and samples were collected by a representative of the engineering department and analyzed in the laboratories of the State Board of Health. The results of these analyses were not at all satisfactory as indicating a water of good sanitary quality, although some of them were. It is possible that the pumping tests were not of sufficient duration; nor were the locations of the wells chosen so as to give a conclusive test as to what might be obtained by a permanent and carefully constructed installation.

It is understood that since the completion of the work of the commission, the city has retained the services of a consulting engineer, who now submits general plans for deriving by means of twenty 12-inch wells, 100 feet apart, a ground water supply from extensive gravel deposits said to exist along and under the river near the northerly corporation limits; also for the rebuilding of the pumping station near this place and the installation of new machinery, new force main, and new high service standpipe. Two tentative locations for the new station and wells are shown, one just above Line Island and the other about one-half mile above. No detailed plans have been made and no test wells other than those above discussed have been sunk. Nevertheless, the city has authorized a popular election to be held on March 27th, 1911, to vote on a bond issue of some \$175,000 with which to carry out the improvement suggested by the present consulting engineer.

The consulting engineer presents evidence of the success of the well system at Bellevue, Pennsylvania, which system is said to be located in a formation similar to that which exists at East Liverpool.

The local officials do not ask the Board for a definite approval of this plan until it has been thoroughly tested out, and in the report of the consulting engineer made to the city, it is proposed to thoroughly test four or five of the wells before proceeding with the permanent installation.

CONCLUSIONS.

It is clear, therefore, from the foregoing, that in the absence of extensive tests, and also in view of the rather unsatisfactory results obtained by sampling the test wells already installed, there is no ground for approving plans at this time.

On the other hand, we have no definite proof that the supply secured in the manner recommended, if the geological formation proves to be as favorable as is claimed, would not be satisfactory in sanitary quality and in quantity.

ACTION OF THE BOARD.

At a meeting held March 2nd, 1911, the State Board of Health considered the plans submitted February 17th, 1911, by Mr. C. V. Beatty, director of public service, and Mr. J. N. Chester of Pittsburg, consulting engineer, for developing a public water supply for the city of East Liverpool, to be derived from wells located along the bank or in the bed of the Ohio River.

The Board voted to permit the city to proceed with the proposed plan with a view to installing a well water system provided it is shown by proper tests that a sufficient quantity of water of satisfactory quality can be secured in this manner; the results of such test to be laid before the State Board of Health for its approval before use of this supply is made.

TABLE OF VITAL STATISTICS FOR EAST LIVERPOOL.

Year.	Population.	Total Deaths.	Total Deaths per 100,000 Popula- tion.	Typhoid Deaths.	Typhoid Deaths per 100,000 Popula- tion.
1893	12,615	145	1120	6	47
1894	13,168	146	1105	4	31
1895	13,721	159	1160	12	87
1896	14,274	165	1150	11	77
1897	14,827	154	1020	4	27
1898	15,380				
1899	15,933	121	760	17	107
1900	16,485	196	1185	17	103
1901	17,038	187	1100	26	153
1902	17,591	226	1290	15	85
1903	18,144	337	1860	13	72
1904	18,697	249	1320	5	27
1905	19,250	308	1600	12	62
1906	19,803	287	1450	13	66
1907	20,356	371	1850	18	89
1908	20,909	262	1260	15	72
Average		221	1281	12.5	73.7

EXAMINATION OF WATER FROM EAST LIVERPOOL.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1901									
1638	Apr. 16	29	126	c	2 earth.	3.37	.140	.025	.006	1.07
1720	June 25	28	249	c	earthy	4.97	.270	.050	.003	T
1779	July 17	43	u. sl.	dec.	veg.	4.05	.218	.142	.016	.17
1823	Aug. 12	28	207	s	veg.	3.82	.162	.021	.012	T
1867	Sept. 4	36	96	dec.	3 earth.	6.00	.226	.046	.003	.05
1875	Sept. 11	36	u. sl.	dec.	2 veg.	5.72	.194	.052	.003	.08
1902	Oct. 7	35		s	veg.	4.59	.224	.122	u	.10
Average		34	108			4.65	.205	.065	.007	.21

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Suspended Solids.	Residue on Evaporation			Bacteria	
					Total.	Loss on Ignition.	Iron.	Number per cc.	Colon Present.
1638	15.4	9	44	100	178	45	.....	2,300	+
1720	16.8	33	.....	110	257	77	.....	16,300	++
1779	23.4	32	.....	57	244	77	.....	5,600	+
1823	30.7	35	.....	10	241	83	.....	1,100	—
1867	17.8	25	.....	38	192	.....	.....	5,100	—
1875	16.3	34	.....	u.	168	.....	.....	20,000	+
1902	22.7	40	.....	u. sl.	218	.....	.....	12,600	+
Aver ...	20.4	30	.....	53	214	.....	.....	9,000	

No. 1638. Ohio River.

" 1720. " "

" 1779. " "

" 1823. " "

" 1867. " "

" 1875. " "

" 1902. " "

EXAMINATION OF WATER FROM EAST LIVERPOOL.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1901									
1639	Apr. 16	39	83	s	2 earth.	1.71	.092	.024	.004	.10
1719	June 25	23	207	c	v. & e.	4.12	.204	.033	T	T
1780	July 17	25	46	s	2 veg.	3.91	.184	.032	.000	.08
1824	Aug. 12	50	v. sl.	v. sl.	2 veg.	3.04	.086	.003	T	T
1868	Sept. 4	37	389	dec.	earth.	6.96	.276	.024	.002	T
1876	Sept. 11	39	73	dec.	2 veg.	5.49	.152	.007	.000	.00
1903	Oct. 7	28	slight	s	veg.	4.36	.166	.058	u	.12
2008	Dec. 10	50	92	dec.	veg.	6.20	.302	.104	.002	.07
Average		35	111			4.47	.183	.036	.001	.05

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Suspended Solids.	Residue on evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
1639	7.3	8	23	54	112	31	.....	1,200	—
1719	17.6	30	.....	95	243	79	.....	7,200	+
1780	24.0	30	.....	35	218	120	.....	2,200	—
1824	30.7	38	.....	u. t.	220	63	.....	2,300	—
1868	18.7	22	.....	27	241	.....	.....	4,200	—
1876	17.0	29	.....	u.	113	.....	.....	2,600	—
1903	21.2	39	.....	u. sl.	195	.....	.....	1,900	—
2008	19.7	19	.....	50	189	.....	.....	28,900	+
Aver....	19.6	27	.....	46	195	.....	.....	6,100	

Source of Samples.

No. 1639.	Hydrant.
" 1719.	"
" 1780.	"
" 1824.	"
" 1868.	"
" 1876.	"
" 1903.	"
" 2008.	"

EXAMINATION FROM EAST LIVERPOOL.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
4140	1904 Nov. 1	30	10	v. sl.	pecul.	4.25	.122	.084	trace	none
7533	1908 Mar. 17		100	decided	earth.	7.40	.354	.030	trace	none

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
4140	22.5	31	37	.....	168	47	.8	1,500	
7533	5.6	none	.....	.....	262	.....	.....	1,800	not in 50 cc

Source of Samples.

No. 4140. Ohio River.
 " 7533. Hydrant

REPORT ON POLLUTION OF COWLES CREEK AT GENEVA BY THE SEWAGE FROM THE VILLAGE PURIFICATION PLANT.

On February 18th, 1911, the following petition was received from Mr. W. K. Gault, clerk of the board of health of Geneva:

"To the Ohio State Board of Health,

I, the undersigned, clerk of the board of health of the village of Geneva, Ashtabula County, State of Ohio, do hereby certify that the board of health of said village, being in session on the 16th day of February 1911, adopted a resolution of which the following is a true copy.

Resolved, That the council of Geneva village, located in Ashtabula County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Cowles Creek, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of the village of Geneva, Ashtabula County, Ohio, who reside in the vicinity of said stream.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said council of Geneva, Ohio, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) W. K. GAULT,
Clerk of Board of Health, Geneva, Ohio."

Dated at Geneva, Ohio, this 16 day of February, 1911.

The above petition was referred to the chief engineer as a committee, and the following report was submitted:

Geneva is a village of about 2,500 inhabitants located in the northerly part of Ashtabula County four miles from Lake Erie. Cowles Creek, a small stream, passes through the central part of the village and discharges into the lake.

Beginning in 1904, the village installed a system of sewers and a sewage purification plant, the latter being located near the northerly edge of the village. The purification plant comprises a septic tank, storage reservoir, dosing tank, and six intermittent sand filters. The works are fully described in the special report of the State Board of Health on water and sewage purification, published in 1908.

On account of the large amount of infiltration water which enters the sewers, the sewage flow is large and the filters are operated at a high rate; but in view of the weak character of the sewage, there has been little or no complaint from odors although the plant is located rather near to several houses.

In spite of the high rate of filtration, it is claimed by the superintendent of sewers that the plant has always been capable of taking care of the sewage. Nevertheless, it was admitted that during high stages of the creek a portion of the sewage is discharged directly into the stream. Furthermore, about twice a month, regardless of the stage of the creek, the by-pass is opened for ten or fifteen minutes for the purpose of keeping the valve from rusting.

At the time of the inspection, which was made by one of the engineering assistants, there were no evidences of pollution of the creek; hence there are at present no grounds for the Board to take action under the Bense Act. The high rate at which the sand filters are operated, however, (nearly 600,000 gallons per acre per day), clearly shows that continued good results cannot be expected from the plant unless it is enlarged in the near future. Furthermore, the fact that the sewage is from time to time by-passed into the creek, would in itself indicate that the present capacity of the plant is not sufficient.

ACTION OF THE BOARD.

At a meeting of the State Board of Health, held April 21st, 1911, the report of the committee appointed to investigate the complaint in regard to the pollution of Cowles Creek at Geneva, was considered, and it was found that there was no ground for the Board's taking action under the Bense Act.

The board of health of Geneva was notified that the filters were found to be overworked and the enlargement of the present plant, or a new plant farther from the village, would undoubtedly be necessary in the near future.

One of the engineers visited Geneva in July and found that the nuisance had been abated and that the health authorities were satisfied with present conditions.

REPORT ON PROPOSED WATER PURIFICATION FOR LIMA.

At a meeting of the State Board of Health held on December 7th, 1910, the following Bense Act petition was considered:

To the Ohio State Board of Health:

I, the undersigned, clerk of the board of health of the city of Lima, Allen County, State of Ohio, do hereby certify that said board being in session on the 26th day of November, 1910, adopted a resolution of which the following is a true copy.

RESOLVED, That the public water supply of the city of Lima, located in Allen County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said city of Lima, Allen County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical, to require said city of Lima to secure a new source of water supply, or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) H. J. LAWLOR,
Clerk of Board of Health,

Dated at Lima, Ohio, this 30th day of November, 1910.

Following a hearing on January 25th, 1911, of local officials consisting of the mayor, director of public service, city solicitor, city clerk, city engineer, and two councilmen, action was taken by the Board as set forth in the following letter:

"COLUMBUS, OHIO, February 25th, 1911.

*To the Mayor and Council, and The Director of Public Service,
Lima, Ohio.*

DEAR SIR: I enclose herewith an order of the State Board of Health, duly approved by the Governor and the Attorney General, requiring your city to con-

struct and place in operation a water purification plant, satisfactory to the State Board of Health, by November 1st, 1911.

If you desire to make an appeal to this order under the provisions of Sections 1257 and 1258 of the General Code, you would have an opportunity to present such appeal to the State Board of Health at a meeting of the Board which will be held at the Hotel Sinton, Cincinnati, on Thursday evening, March 2nd, 1911.

Yours truly,

(Signed) C. O. PROBST,
Secretary.

On March 2nd, 1911, the mayor and city solicitor of Lima, appeared before the Board and stated that the city would appeal the order of the Board and appoint a referee engineer as provided for in the law. They requested that the Board also appoint a referee. Mr. Allen Hazen was subsequently appointed by the city of Lima as referee engineer, but the State Board of Health appointed no referee on its part.

On April 8th, 1911, subsequent to the preparation of the report of the referee engineer, the city solicitor of Lima submitted a proposition outlining a method of purifying the water by sterilization with calcium hypochlorite; also a sketch plan showing the layout of the water works and proposed location of the sterilizing plant. The project was considered by the Board on April 21st, 1911, action being taken as set forth in the following letter.

"COLUMBUS, OHIO, April 24th, 1911.

MR. W. J. McLAUGHLIN, *City Solicitor, Lima Ohio.*

DEAR SIR:—At a meeting of the State Board of Health, held April 21st, 1911, your request that the Board approve in a general way the proposition to purify the public water supply of the city of Lima by the so-called 'Chloride of Lime' treatment, was considered.

I was instructed to say that the Board would withhold its official approval of this method of water purification pending an experimental investigation of the method on the reservoir water at Lima, carried on for a period of from four to six months, daily analyses to be made of the water before and after treatment, copies of which are to be submitted from day to day to the Board. The Board would expect such experiment to be conducted by some one thoroughly conversant with the chlorine treatment. The question of official approval of this plan will be considered by the Board after this experimental investigation has been completed.

Yours truly,

(Signed) C. O. PROBST,
Secretary.

Soon after this the city of Lima took steps to follow the instructions of the Board and constructed a plant for the treatment of the water supply, equipped a laboratory, engaged the services of a chemist, and made plans for the carrying on of experimental study of hypochlorite treatment. The experimental work was begun on July 24th, 1911, and will be continued until the latter part of November.

The operation of the experimental plant has been closely watched by the engineering department and frequent visits have been made to learn the efficiency of the treatment. Based on reports of the city chemist and information obtained through investigations by the State Board of Health, the following report was submitted:

Lima is a city of 30,000 population and is enjoying a flourishing growth, having increased about 40 per cent., during the last decade. It is situated in the central portion of Allen County, upon the Ottawa River, which stream serves both as a water supply and a means of removal of sewage. The public water supply of the city was installed in 1887; the original supply was of surface origin, being obtained from Lost Creek, a tributary of the Ottawa River. This supply became inadequate with the growth of the city and it was necessary to augment it from time to time, by the use of water from drilled wells and from the Ottawa River.

In 1904, after the city had obtained engineering advice, an entire new supply was installed. This improvement included the construction of a large storage reservoir, situated about five miles east of the city and immediately north of the Ottawa River; and a conduit line to the existing reservoirs at the pumping station. The water was obtained from the Ottawa River, being pumped by centrifugal pumps during high stages of the stream into the reservoir and allowed to purify by sedimentation. This new supply was installed without the approval of the State Board of Health.

After the installation of the new supply the Lost Creek supply remained in use for a few years furnishing a portion of the water used. During recent years, however, the Lost Creek supply has been cut off and the Ottawa River has furnished the entire supply.

A complete detailed description of the various features of the public water supply of Lima has been given in previous reports and will not be repeated here. Suffice it to say that the supply is drawn intermittently from the Ottawa River, is stored in a reservoir about 600,000,000 gallons capacity, from which it flows through a conduit to reservoirs of about 120,000,000 gallons capacity, from which in turn it is pumped directly into the distribution system.

Description of Experimental Apparatus. The apparatus provided for experimental studies consists of a small experimental outfit for auxiliary investigations and a temporary plant for the treatment of the entire supply. The small outfit consists of a barrel of 53 gallons capacity to contain the chemical solution; an orifice box, through which the discharge of the chemical takes place; a mixing box, where the chemical is applied to the raw water and thoroughly mixed; and a 10-inch pipe line 120 feet long in which the treated water is stored. It was the original intention that the flow of treated water through the pipe line should be continuous and at different rates, but this was found to be impractic-

cable and the pipe line was, therefore, used for storage. The operation of this apparatus was intended to show the effect of the quantity of hypochlorite used and to indicate what changes take place in the bacterial content of the water after treatment.

The plant installed for temporary treatment of the water supply consists of two cypress solution tanks of 1,000 gallons capacity each, which discharge through an orifice box into the raw water. This plant was located near the pumping station directly over a large manhole in the conduit leading from the lower reservoirs to the pump well. Previous to October 3rd, the solution was discharged into the manhole without provision of proper distribution through the water in the conduit. The solution did not directly enter the water flowing through the conduit but was applied at the surface of the dead water standing in the manhole. After October 3rd an improvement was made by an addition of a pipe and grid, through which the hypochlorite was carried downward and distributed across the stream in the conduit. Subsequent to the treatment and before the water is pumped into the distribution system there is an average storage of about 30 minutes.

Method of Conducting Experiments. The small experimental outfit was used principally to learn the effects of variations in the amount of chemical used and the length of storage after treatment. The temporary plant was operated to show actual results.

The operation of the small pipe line apparatus has consisted in treating about 500 gallons at a time with hypochlorite in quantities varying from 0.36 to 1.3 parts available chlorine per million. After treatment samples were collected at intervals after storage of 15 minutes to 72 hours or more. In the use of the small experimental outfit it was necessary, in order to obtain untreated water from the pump well, to interrupt the operation of the temporary plant for treatment of the supply. It was not until the studies with the pipe line apparatus were completed, therefore, that the supply was continuously treated. The studies relating to the effect of treatment of the water supply comprised the application of from 0.22 to 0.53 part per million available chlorine and the examination of bacterial samples taken from various portions of the distribution system.

Results of Studies. The results of the examination of samples obtained in the operation of the small pipe line apparatus do not furnish conclusive data, but indicate in a general way that one or two hours' storage is necessary in order that the disinfection may take place. It is also shown that after the maximum decrease has occurred a subsequent increase or aftergrowth of bacteria takes place. Continued storage produced a constant increase in numbers until at times 100,000 or more per cubic centimeter were present in samples stored 70 to 100 hours. It should be stated that these results were obtained by the city chemist at

Lima and were not checked by analyses made by the State Board of Health.

Owing to the unsatisfactory laboratory facilities, not much dependence can be placed upon the results of determinations of total numbers of bacteria made by the city chemist at Lima. The results of the bacterial examination of samples of the raw and treated water show wide fluctuations in the bacterial content of the raw water and, moreover, fail to indicate a marked reduction after treatment. These discrepancies may be attributed in part to the impossibility of securing properly sterilized media. The tests for *B. coli* are more indicative of the effect of the hypochlorite. The analyses indicate the presence of *B. coli* in the raw water six days out of a total of seventy-six days of examination. The treated water, however, as shown by samples collected from different portions of the distribution system, with one exception, were free of the colon bacillus in 10 c.c. portions. It should be remarked that the treatment with hypochlorite at no time exceeded 0.53 parts per million available chlorine and at no time during the studies were chlorine tastes or odors apparent in the treated water.

On October 10th, 1911, a representative of the engineering department visited Lima and collected a series of samples for bacterial examination. The treatment of the city water had been continuous for ten days previous to the visit. Samples were collected, plated, etc., with apparatus from the laboratory of the State Board of Health. The results of this examination showed the presence of *B. coli* in 1 cubic centimeter of the water from Lima Lake and in 10 cubic centimeters of the water previous to treatment. All of the samples of the treated water were found, however, to be free from this organism. The reduction of total numbers was also shown in this examination, though owing to the bacterial content of the raw water the reduction is not striking.

Vital Statistics of Lima. In an accompanying table will be found a tabulation of vital statistics for recent years. It will be seen that the typhoid fever death rate from 1900 to 1904 was higher than the accepted normal rate for a city with a pure water supply. After 1904, during which year the large storage reservoir was constructed, the typhoid fever death rate was reduced, but again in 1910 the figure is rather high. Judging from these statistics, the supply obtained from the Lima Lake reservoir is of better quality than the Lost Creek supply. Although the occasional high rates would indicate that the safety of the Lima Lake supply is not assured at all times.

Comparing the deaths during 1911 with those of preceding years, it will be seen that no noticeable reduction in deaths occurred as a result of the treatment of the water supply. Assuming that the hypochlorite was efficient in destroying pathogenic bacteria it would appear that the typhoid fever deaths may be attributed to other causes than the water

supply. Unfortunately no accurate record of the number of cases of typhoid fever can be secured as no complete reports are made to the local health officer.

Effect Upon Physical Characteristics of Water. Although in no way associated with the intent of the studies, it may be well to mention the effect of the hypochlorite treatment upon the physical characteristics of the raw water. The water from the lower reservoirs contains color, frequently turbidity, and at times, odors and tastes from micro-organisms. The application of the disinfectant in no way improved the physical quality of the water, although it is claimed that no local complaint against the characteristic "chlorine" taste has resulted from its use.

SUMMARY.

In the foregoing report the following are the salient facts:

1st. The city of Lima in compliance with the Board's requirements has conducted experimental studies in the disinfection of the public water supply; these studies have extended from July 24, 1911, to date, during which time almost daily bacteriological examinations of the water have been made.

2nd. The raw water has been shown to contain intestinal organisms in six out of seventy-six samples examined by the city chemist, and in two out of eight samples examined by the State Board of Health during this period. The bacterial content has averaged 2,710 per cubic centimeter according to the city chemist and 270 per cubic centimeter in samples examined by the State Board of Health.

3rd. The treated water has been shown to be free from intestinal organisms in 115 out of 116 samples examined by the city chemist and in all samples examined by the State Board of Health.

4th. The records of deaths from typhoid fever during the months of treatment in 1911 compared with deaths for corresponding months for the preceding years show no reduction indicating that the water supply may not be accountable for the disease.

The fluctuation in typhoid fever rates from 1905 to 1910 indicate that the water supply was not entirely safe-guarded by the Lima Lake reservoir constructed in 1904.

5th. The physical characteristics of the water, including color, turbidity, and odors, are not affected by the hypochlorite treatment.

CONCLUSIONS.

From the foregoing it is apparent that the hypochlorite treatment is effective in the extinction of intestinal organisms and, when efficiently attended to, may be depended upon to produce a safe water. The studies indicate, however, that the raw water during a large portion of the time is free from colon bacillus, making the use of hypochlorite at all times,

unnecessary. Since the physical quality of the raw water is not improved by this treatment, its effect is only the removal of the danger of producing disease. It is, therefore, apparent that the hypochlorite treatment should be supplemented by, or rather should supplement treatment by filtration if a satisfactory supply from a physical standpoint is to be secured.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held November 21st, 1911, the general project of purifying the public water supply of Lima, in compliance with the Board's order of February 25th, 1911, by treatment with calcium hypochlorite as outlined in the communication and plan received from Mr. J. W. McLaughlin, city solicitor, on April 8th, 1911, was approved upon the following conditions:

1st. That detailed plans and specifications of the plant for the treatment of the water be submitted to and receive the approval of the State Board of Health; and that such plans be so prepared that the tanks and devices for applying the calcium hypochlorite as well as the basins for holding the treated water be so arranged that they can be incorporated in a future filtration plant;

2nd. That there be installed, when deemed necessary by the State Board of Health, means for filtering the water in connection with the use of calcium hypochlorite, or in connection with the use of a coagulant, or in connection with both;

3rd. That a competent chemist and bacteriologist, satisfactory to the State Board of Health, be placed in charge of the operation of whatever plant may be installed; and that the operator maintains complete records of the operation of the plant and furnish copies of same to the State Board of Health; and,

4th. That this approval be void unless satisfactory plans shall have been submitted prior to March 1st, 1912, and construction of the plant begun prior to June 1st, 1912.

The attention of the authorities of Lima was called to the following facts:

1st That investigations of the State Board of Health have demonstrated that the water supply from Lima Lake, while usually safe, is at times contaminated and unsafe, and that its physical characteristics are objectionable;

2nd. That while the hypochlorite treatment properly conducted is efficient in the extinction of intestinal bacteria, it has no effect in improving the physical characteristics of the water; and,

3rd. That the hypochlorite treatment if used should more properly supplement the process of filtration.

EXAMINATION OF WATER FROM LIMA.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Ammonia. Albuminoid	Free Ammonia.	Nitrites.	Nitrates.
	1911									
10855	Oct. 10	32	64	decided	veg.	7.2	.222	.092	.0006	.6
10856	Oct. 10	22	11	dis. alg.	sl. veg.	4.8	1.454	.026	.0004	.6
10857	Oct. 10	17	6	slight	musty	3.92	.188	.170	0	.6
10858	Oct. 10	18	6	slight	musty	4.41	.214	.030	0	.6
10859	Oct. 10	Bottle containing chemical sample broken.								
10860	Oct. 10	23	13	distinct	musty	4.46	.220	.016	0	.6
10861	Oct. 10	24	16	distinct	musty	5.24	.238	.038	.0002	.6
10862	Oct. 10	12	16	distinct	musty	3.77	.220	.034	.0004	.6
10863	Oct. 10	13	14	distinct	musty	4.41	.212	.016	.0004	.6
10864	Oct. 10	19	15	distinct	musty	4.41	.178	.024	.0004	.6
10865	Oct. 10	18	16	distinct	musty	5.04	.204	.034	.0004	.6
10866	Oct. 10	12	4	slight	musty	3.97	.230	.004	.0004	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
10855	50	156	117.5	559	112	2.1	5000	In 1 cc.
10856	65	122	115.	514	141	0.4	700	In 1 cc.
10857	65	116	117.5	547	133	0.3	4750	Not in 10 cc.
10858	75	116	117.5	460	98	0.3	1100	Not in 10 cc.
10859	*	*	*	*	*	*	600	Not in 10 cc.
10860	60	120	120.	492	119	0.5	2500	Not in 10 cc.
10861	65	116	115.	486	115	0.5	160	Not in 10 cc.
10862	70	120	115.	467	85	0.6	160	Not in 10 cc.
10863	65	116	117.5	488	114	0.7	100	Not in 10 cc.
10864	65	119	117.5	462	85	0.6	15	Not in 10 cc.
10865	75	119	117.5	495	119	0.8	12	Not in 10 cc.
10866	75	124	120.	480	110	0.4	500	Not in 10 cc.

Source of Samples.

No. 10855. Pump discharge into Lima Lake at low lift pump station.

No. 10856. Outlet to Lima Lake.

No. 10857. Hydrant at west side fire department.

*Bottle containing chemical sample broken.

- No. 10858. Hydrant at 1092 North Main Street.
 - No. 10859. Hydrant at 1099 South Main Street.
 - No. 10860. Hydrant at greenhouse on Bellefontaine Avenue.
 - No. 10861. Tap in Hester's Pharmacy.
 - No. 10862. Tap at old city building.
 - No. 10863. Hydrant at 869 East High Street.
 - No. 10865. Tap on high pressure pump discharge.
 - No. 10866. South reservoir at the high pressure pump station.
- The above samples were all collected by Mr. L. H. Van Buskirk.
-

REPORT ON INVESTIGATION OF THE SEWERAGE OF LIMA.

On August 8th, 1911, there was received from Mr. C. A. Rusler, clerk of Shawnee Township, a complaint made in accordance with the provisions of the Bense Act regarding the pollution of Ottawa River by the sewage of Lima. This complaint was referred to the chief engineer as a committee to make the necessary investigation and report. Accordingly, the chief engineer visited Lima on September 28th, 1911, and this was followed by a detailed inspection of the existing sewer outlet made by one of the engineering assistants on October 12th, 1911. The following report was submitted:

The city of Lima had a population in 1910 of 30,508. It is provided with a large number of sewers built, in general, in an unsystematic manner and used for both domestic sewage and storm water. In many cases they are inadequate to receive the storm water which is discharged into them. A general map of existing sewers has been prepared by the engineering department in accordance with data obtained by personal inspections, as well as with information secured from the city engineer. From this map it may be seen that 80 or 90 per cent. of the area of the city is accessible to the sewers, and that these sewers discharge into Ottawa River through 41 independent sewer outlets, ranging in size from 12 to 60 inches. The map also indicates forcibly the fact that the large majority of the sewers are 12 inches or under in diameter, and this accounts for the objectionable conditions which occur in certain districts of the city due to improper drainage and consequent flooding of cellars with storm water and sewage.

During our recent investigation it was learned that the largest amount of sewage discharged through any one outlet occurred in the Timberlake sewer, which is 60 inches in diameter and which drains a territory covering nearly one-fourth of the area of the city. Other large sewers now in use are the Watt Town sewer, 36 inches in diameter, and the Askins sewer.

In this connection it is of interest to note that plans for the Timberlake, Watt Town and Askins sewers were presented to the Board on

May 8th, 1900, eleven years ago; and that these plans were approved upon the condition that all sewage now being, or hereafter to be discharged into the Ottawa River should be purified in a manner satisfactory to the State Board of Health before the proposed Timberlake, Watt Town, and Askins sewers were brought into use. The condition of approval of these sewers was apparently ignored; as the sewers were soon after constructed and have been used ever since regardless of the fact that the attention of the officials was called to the condition of approval before the sewers were completed.

It would seem, therefore, that aside from any question of the constitutionality of the Bense Act, the city of Lima is illegally discharging sewage into the Ottawa River and that action for the purpose of forcing the installation of the sewage purification works could be fought on this ground. Referring to the polluted condition of the Ottawa River, there is no question but that within the corporate limits and several miles downstream, this river is one of the most foully polluted ones in the state. In the opinion of the writer it is probably second only to Mill Creek as regards intensity of pollution.

A few years ago the offensiveness of the polluted stream was somewhat relieved by the construction of a narrow channel in the rock which forms the stream bed. This to a certain degree prevents stagnant pools through the city. On the other hand, this so-called improvement increased the pollution of the creek in Shawnee Township, the home of the complainant, which adjoins Lima on the southwest.

The present water works of Lima, by which water is taken from the Ottawa River above the city, tends to decrease the flow of the stream and will thus intensify the pollution.

Another factor which has, during the past few years indirectly caused an increased number of complaints about sewage disposal conditions, is the fact that with the abandonment of a large number of oil wells in the vicinity of Lima the discharge of oil and salt water into the stream has practically ceased; and as these served to cover up or possibly to a certain extent purify the sewage, their absence permits the creation of the foul odors and unsightly appearance which accompanies a badly polluted stream.

CONCLUSIONS.

As a result of an investigation of the existing sewerage of Lima, made in answer to a complaint under the Bense Act from Mr. C. A. Rusler, clerk of Shawnee Township, it was found that the Ottawa River at and for several miles below the corporate limits of Lima is grossly polluted and causes conditions detrimental to the health and comfort, not only of the citizens of Lima, but also to those living in Shawnee Township.

If the Bense Act were constitutional there is no doubt that the physical condition of the stream is such as to afford ample grounds for

an order by the State Board of Health for purification works to treat the sewage of the entire city. In view of the present litigation regarding the Bense Act, however, and also in view of informal advice given by the Attorney General, it is probable that such an order issued at this time could not be enforced.

Nevertheless, as the sewage from the principal sewer in the city (Timberlake sewer), as well as that from two other of the large sewers (Watt Town and Askins sewers) is being discharged into the stream in violation of the action of the State Board of Health, it is believed that some legal action against the city would be justified. If a plant to purify the sewage from the above sewers were installed, the remaining sewage could be readily handled also.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held November 21st, 1911, this report was considered.

It was found that the Ottawa River was being grossly polluted by the sewage from Timberlake, Watt Town and Askins sewers, and furthermore, that the discharge of sewage from these sewers into the Ottawa River was in direct violation of the action of the State Board of Health of May 8th, 1900, approving the plans for these sewers upon the condition that the sewage should be purified before the sewers were used.

The Secretary was instructed to call the attention of the authorities of Lima to this violation of the Board's approval of May 8th, 1900, and to notify them that the State Board of Health would require the city of Lima to prepare plans for a sewage purification plant, suitable for purifying the sewage from Timberlake, Watt Town and Askins sewers, and submit the same to the Board for approval not later than March 1st, 1912, the installation of such sewage purification plant, in accordance with approved plans, to be begun not later than July 1st, 1912.

They were also notified that in the event that the city of Lima failed to take this action, the matter would be referred to the Attorney General's department for legal procedure.

REPORT ON INVESTIGATION OF THE EXISTING WATER SUPPLY OF PLYMOUTH.

On September 12th, 1910, there was received from Dr. J. F. Holtz, health officer of Plymouth, the following petition:

"To the Ohio State Board of Health:

I, the undersigned, being the duly elected and qualified health officer of the village of Plymouth, Richland County, State of Ohio, do hereby make complaint that, in my opinion and belief, the public water supply of Plymouth, located

in Richland County, Ohio, is impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said village of Plymouth, Richland County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical to require said village of Plymouth to secure a new source of water, or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) J. F. Holtz, M. D.,
Health Officer.

Dated at Plymouth, Ohio, this 10th day of September, 1910."

On September 14th, 1910, the president of the Board appointed the chief engineer as a committee of one to investigate and report. Accordingly, he visited Plymouth on November 2nd, 1910, and the following report was submitted:

The village of Plymouth lies on the county line between Richland and Huron counties and is on a small stream known as the west branch of the Huron River. The population is locally estimated at about 1,300, which agrees fairly well with an estimate made from the United States census reports. The growth of the village is said to be steady but small. The area within the corporation limits is about one square mile.

Plymouth is somewhat of a farming center and many of its principal citizens are retired farmers. In addition there are several manufacturing establishments.

Plymouth has no sewerage system but there have been installed several storm water drains which receive more or less domestic sewage and which discharge into the west branch of the Huron River. Plans for a proposed system of water supply were first submitted to the State Board of Health for approval in 1901 by Mr. J. B. Weddell, consulting engineer. These plans contemplated the use of the west branch of the Huron River as a source of supply, and the Board approved this supply subject to the following conditions:

"First, that the water should be filtered in a manner satisfactory to the State Board of Health, and

Second, that plans showing the proposed method of filtration be submitted to and receive the approval of the State Board of Health."

In spite of this action of the State Board of Health, the village shortly after installed a water supply, taking the source not from the west branch of the Huron River but from a small tributary to the west branch of said river, and introduced the water into the distribution system without first submitting it to purification. This supply, in addition to the fact that it was subjected to dangerous pollution, proved inadequate, and subsequently there were installed a number of wells. Certain

of these wells were not approved by the State Board of Health; others, installed in 1906, were installed under the following conditions:

“1st. That the sewer which now discharges at the top of the bank a few hundred feet northeast of the location be diverted and made to connect with the main sewer of the village;

2nd. That the drainage originating in the vicinity of the railroad water tank be conveyed through a properly constructed sewer and disposed of in connection with the remaining sewage of the village;

3rd. That no source of pollution which, in the opinion of the State Board of Health, would affect the quality of the water be permitted within 500 feet of any well used as a source of public water supply; and,

4th. That all direct connection with the creek, by means of which unpurified creek water can enter the distribution system, be cut off.”

At the present time, as learned from the health officer, the wells do not furnish a sufficient supply of water for the village. The amount of water obtainable from the wells is said to be not more than 20,000 gallons per day, while the total water consumption during the summer months is as large as 60,000 gallons per day; the deficit, therefore, must be made up of creek water. The engineer in charge of the water works stated to a representative of the State Board of Health that there was at all times a direct connection between the creek and the dug well from which the supply is pumped. The creek upon which the village must under present conditions depend, at least for a partial supply, has a watershed, above the intake, of about three square miles and supports a dense rural population. There are on this watershed some twenty-five houses with accompanying privies and vaults.

The stream is unguarded from pollution and it is claimed that it is sometimes used for washing clothes as well as for bathing. The writer, some four years ago, during an inspection of the supply, witnessed the flushing out of filthy cattle cars, which stood on the railroad embankment above the creek, in such a manner that the wash water reached the intake within a few minutes. While it is claimed, following the complaint made to the State Board of Health at this time, that the washing of cattle cars at this point has been abandoned, yet cattle are still watered at this point, subjecting the water supply to a danger nearly as great as that from flushing the cars.

The conditions under which the wells were approved in 1906 have not been complied with, either in regard to preventing the contamination of the ground in the vicinity of the wells or the cutting off of the creek water. Of course, fulfillment of the last condition was impossible if a sufficient supply for the village was to be obtained, as the wells proved decidedly deficient. From the time of installation of the water supply in 1901, therefore, to the present time, the village authorities have apparently ignored practically all the rulings and advice of the State Board of Health.

ACTIONS OF THE BOARD.

This report was considered by the State Board of Health at a meeting held December 7th, 1910, and the Board found that the water supply of Plymouth was impure and dangerous to health.

After giving the authorities a hearing, at a meeting held May 10th, 1911, the Board voted to transmit its report and findings to the Governor and the Attorney General for their action thereon; and the following order was submitted to the Attorney General May 16th, 1911:

ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF PLYMOUTH.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions in the village of Plymouth, Richland County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the health officer of the village of Plymouth, Richland County, Ohio, as required by Section 2 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7th, 1908 (99 O. L. p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the public water supply of the village of Plymouth is impure and dangerous to health; and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 7th day of December, 1910, notified the mayor and council of the village of Plymouth of its said findings, and gave the said village an opportunity through them to be heard on the 25th day of January, 1911; and

WHEREAS, On the 25th day of January, 1911, no representative from said village of Plymouth having appeared, a letter was presented from the village clerk, E. K. Trauger, stating that council waived its right to a hearing and that the village was about to take definite action towards securing a better water supply; further consideration of the matter was postponed by the State Board of Health; and

WHEREAS, On the 9th day of May, 1911, there appeared before the State Board of Health Mr. O. S. Earnest, mayor, and Mr. B. F. Long, village solicitor, and stated that the tax valuation was insufficient to raise the necessary amount of money to carry out the Board's instructions as regards the improvement of their public water supply, and requested the State Board of Health to issue an order under the Bense Act requiring such improvement to be made, thus enabling them to raise sufficient funds.

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health found and determined that the improvements or changes in said conditions aforesaid are necessary and should be made, to-wit: That the village of Plymouth be required to purify the present water supply or secure a new water supply, satisfactory to the State Board of Health, within a period of six months from the date of the approval of the Board's order by the Governor and the Attorney General.

THEREUPON, On motion duly seconded, the report and finding of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

May 16, 1911.

(Signed) C. O. PROBST,
Secretary of State Board of Health of the State of Ohio.

Upon advice of the Attorney General, that the matter be held in abeyance until the case of the city of Greenville vs. N. C. Demorest, et al., be finally disposed of by the Supreme Court, the same law (Bense law) being involved. No further action was taken at this time.

REPORT ON THE POLLUTION OF THE SCIOTO RIVER AND
ITS TRIBUTARIES AT MARION, GREEN CAMP,
PROSPECT, RICHWOOD, MAGNETIC
SPRINGS, AND THE GIRLS' IN-
DUSTRIAL HOME.

On April 24th, 1911, the following Bense Act petition was received by the State Board of Health from the city of Columbus:

"To the Ohio State Board of Health:

I, the undersigned, clerk of the board of health of the city of Columbus, Franklin County, State of Ohio, do hereby certify that the board of health of said city, being in session on the 20th day of April, 1911, adopted a resolution of which the following is a true copy.

RESOLVED, That the municipalities of Marion, Kenton, Prospect, Marysville, and Magnetic Springs, located in Marion, Hardin, Delaware and Union counties, Ohio, are discharging and permitting to be discharged, sewage and other wastes into Scioto River and tributaries, and by reason thereof has polluted said Scioto River, which is used as a source of public water supply by the city of Columbus, Franklin County, Ohio, thereby creating conditions that are detrimental to the health and comfort of the citizens of said city.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said municipalities of Marion, Kenton, Prospect, Marysville, and Magnetic Springs to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) JOHN W. KEEGAN,
Clerk Board of Health, Columbus, Ohio.

Dated at Columbus, Ohio, this 21st day of April, 1911."

Subsequently two letters were received from Green Camp; one from Mr. M. A. Porter, clerk, on July 20, 1911; and the other from Mr. G. W. Collins, health officer, on July 21st, 1911. Both of these letters com-

plained of the serious condition of the Little Scioto River near that village, which condition, it was believed, was killing the fish of the stream, and otherwise creating a nuisance. Following the receipt of these letters, one of the engineering assistants visited Green Camp and in company with Mr. G. W. Collins, local health officer; Mr. Addison Bain, health officer of Marion; Mr. S. R. Rauhauser, director of public service of Marion; and Mr. Ullom, supervisor of township ditches of Marion township, inspected the Little Scioto River from its confluence with the Scioto River to Marion.

The observations made at the time of this inspection, July 27-28, 1911, were reported to the Secretary and the chief engineer of the State Board of Health; and after a conference with the Columbus water works officials it was decided to conduct a more extensive investigation which would include the collection of a series of samples from various points along the Scioto River and its tributaries. The inspection was made on August 1-2, 1911, by automobile, furnished by the Columbus water works, and the engineering assistant was accompanied by Mr. J. F. Hill, river patrolman.

Following this inspection, Richwood was visited on August 8, 1911, in answer to a complaint received by the State Board of Health from Mr. J. A. Eddy, complaining of local sewerage conditions.

On August 17, 1911, the general sanitary conditions at Magnetic Springs, especially as they are related to the Columbus water supply, were inspected. The following report was submitted:

WATERSHED.

The Scioto River rises in Hardin County about 65 miles north of Columbus, and flows through Marion, Delaware and Franklin counties before reaching Columbus. The area of the watershed above the confluence of the Scioto River with the Olentangy River is about 1070 square miles. The country included within this area is almost entirely agricultural and is highly cultivated, there being but very few wooded areas. Throughout the area the bed rock nearest the surface is the Onondaga limestone, which is exposed in the bed of the Scioto throughout its course. The limestone is covered with drift, which does not average over 30 or 40 feet in depth. The upper portion of the shed is very flat, but gains a more rapid fall south of Kenton.

The principal tributaries to the Scioto River are the Little Scioto River, 42 miles; Fulton Creek, 30 miles, Bokes Creek, 26 miles; and Mill Creek, 20 miles above Columbus.

Upon the Scioto River and its tributaries are located two cities and several villages and smaller communities. The following table gives their respective distances, by water, above Columbus, and their population according to the 1910 census;

Community.	Miles above Columbus.	Population 1910 census.
Kenton	68	7,185
Marion	48	18,232
Green Camp	42	308
Prospect	36	945
Richwood	39	1,728
Magnetic Springs	34	155
Ostrander	25	431
Hilliards	9	370
Dublin	12	239
Mt. Victory	64	740
Ridgeway	74	427
Alger	80	730
McGuffey	84	491
West Mansfield	62	913
Rushsylvania	76	560
Larue	52	772
New Bloomington	48	304
Marysville	36	3,576
Girls' Industrial Home.....	16	450
Total population		38,556

The rural population on the watershed in 1908 was estimated at 42,900. This population has probably not varied greatly during the last three years, so that the total population on the watershed at the present time is approximately 81,450.

SOURCES OF POLLUTION.

Kenton and Marysville, while not visited at the time of these inspections, will be mentioned owing to the serious pollution discharged, respectively, into the Scioto River and Mill Creek. The condition of these two streams, as described in previous reports, is very bad, as a large quantity of sewage without previous purification is discharged into the stream, turning the stream black, depositing sludge upon the bed, and giving rise to foul odors which cause a nuisance in the immediate vicinity of the sewer outfalls.

There is no physical evidence of the pollution of the Scioto River at Green Camp, due to the sewage at Kenton; neither is there any indication that the waters of Mill Creek are polluted at the point of its confluence with the Scioto River at Bellpoint. It must be taken into consideration, however, that self-purification is at its maximum during this season of the year, and consequently it could hardly be expected to obtain evidence of serious pollution at so great a distance from the source. In times of moderately heavy rains and during floods it is very probable that the increased flow would carry the sewage rapidly down the river, thereby polluting the Columbus supply.

Several of the smaller villages were not inspected, and as the amount of sewage contributed by them is very small, they will not be discussed in connection with this report.

Beginning at Marion, the streams and villages contributing pollution to the Scioto River which were inspected, will be discussed. These include Marion, Green Camp, Prospect, Richwood, Magnetic Springs, the Girls' Industrial Home, and the following streams: Rock Swale, Honey Creek, Little Scioto River, Fulton Creek, Bokes Creek, and Mill Creek.

Marion.

The sewerage system together with the sewage purification plant at Marion, are described in detail in a special report of the Ohio State Board of Health (1908) on "Water and Sewage Purification in Ohio," page 534. It will therefore be necessary to give only in a general way the features influencing the pollution of Rock Swale due to the sewage of Marion.

Storm Sewers. Marion is provided with three outfall storm sewers. One of these, draining the eastern portion of the city, discharges on the Olentangy watershed, while the others discharge into Rock Swale. These latter are known as the Silver Street and Columbia Street sewers. Both of these sewers receive varying quantities of sanitary sewage. The quantity of such waste discharged into the sewers is hard to estimate, owing to the uncertainty as to the number of connections. The Silver Street sewer probably is the only one which receives domestic sewage, while the Columbia Street sewer has connections with the Marion brewery and several slaughter houses located southwest of the city. The Silver Street sewer follows Silver Street to the west, discharging into Rock Swale about one mile west of the city limits. The Columbia Street sewer passes west by the Marion Steam Shovel Works, discharging into an open run at the southwest corner of the property. This ditch or run, locally known as Slaughter House Ditch, flows westerly for a distance of approximately $1\frac{1}{2}$ miles, where it discharges into Rock Swale, about $\frac{1}{2}$ mile south of Gurley Pike.

Sanitary Sewers. The present sanitary sewer system embodies about 26 miles of sewers. These sewers discharge into a main trunk sewer which formerly discharged into the Little Scioto River at a point about 60 rods north of Lowe's Bridge on the Green Camp pike. At the time the sewage purification plant was placed in operation a new trunk sewer was constructed. In order to maintain sufficient fall to the sewage disposal plant, it was necessary to follow the line of the old sewer to a point between the Erie Railroad tracks and Silver Street, about $\frac{1}{2}$ mile west of the city limits. The new sewer at this point intercepts all of the sanitary sewage from Marion, the old sewer being completely walled up so that it is impossible for any leakage into the same. The new sewer

extends to the southwest, passing underneath the Erie Railroad tracks and through open farm land to the disposal plant, where it discharges into the grit chamber. At the present time there is a break in the sanitary sewer about half-way between the railroad and the sewage plant. This was caused by the exposure of the pipe. While plowing the field during the spring the plow caught the bell of the pipe, removing a portion, which permits raw sewage to be discharged upon the ground.

The old sewer extends from the point at which the new sewer branches to the disposal plant, to the southwest, discharging into the Scioto River. It was claimed by the city engineer and the superintendent of the sewage disposal plant that neither storm water nor domestic sewage were discharged into this sewer. At the time of the inspection, however, the engineering assistant found an obstruction at the mouth, which, upon removal, allowed sanitary sewage to flow to a depth of about 4 inches in the sewer for a period of at least one hour. Mr. Philip Dryrir, who owns the farm through which the sewer passes, and who lives near the Green Camp bridge, stated that the sewer ran full for a period of from four to six weeks during high water last spring; and from his description of the sewage discharged into the Little Scioto River, it is certain that sanitary sewage reaches it.

Sewage Disposal Plant. The sewage disposal plant, which is described in detail in the report mentioned above, is comprised of a grit chamber; three septic tanks; six contact beds; and six sand filters. The sewage may be by-passed from the septic tanks into the main outfall sewer, as well as from the contact beds. It is found necessary to by-pass the sewage from the septic tanks whenever they are to be cleaned or whenever the chambers underneath the gate houses need cleaning. The sewage is by-passed from the stone beds each night, beginning at about 4:30 in the afternoon and continuing until 8:30 the following morning.

Outfall Sewer. The outfall sewer is constructed of 18-inch vitrified sewer pipe, and extends a distance of 1,900 feet west along Gurley Pike, discharging into Rock Swale. This sewer receives the final effluent from the sewage purification plant as well as all by-passed sewage from the various tanks and beds.

Method of Operation. The sewage purification plant is operated in connection with the garbage crematory. Two men are employed to care for both of these plants. The one has charge of the garbage plant, while the other attends to the operation of the sewage purification plant. There are times when the garbage plant does not require attention and at such times both men work upon the various parts of the sewage plant. They start work at 8:30 A. M. and continue until 4:30 P. M.

At the present time the grit chamber has been so rearranged that it forms a portion of the septic tank. The septic tanks are run in series

so that the sewage entering the grit chamber passes first through the first septic tank, into the second tank, then into the grit chamber, and finally through the third septic tank, from which it flows over a weir into troughs which carry it to the gate houses, where it is allowed to pass as desired on to the contact beds. This rearrangement of the septic tanks and grit chamber increases the distance the sewage is required to flow, but also increases its velocity, thereby making it questionable as to increased efficiency. The superintendent of the plant thinks, however, that the new arrangement promotes a greater degree of sedimentation, and that the effluent from the tanks has much less suspended matter than it had previous to the change.

The contact beds are used intermittently during the day, but during the night, owing to the fact that there is no attendant at the plant, the sewage is allowed to pass directly through the contact beds. It is necessary, in order to use the contact beds properly during the night, to have an attendant always present, since the dosing apparatus is not automatic but controlled entirely by means of hand-operated gates.

The sand beds require constant attention in order to prevent the sewage from overflowing and passing through the ventilators directly to the collection system.

As may be seen from the above general statements, the plant is in need of more attention in order that the contact beds and sand filters may be kept in better condition, and also that all portions of the plant may be operated both day and night. When the plant is operated continuously the amount of partially purified sewage reaching Rock Swale will become much smaller, and the conditions of the ditch will, therefore, be greatly improved.

Quantity of Sewage. The nominal capacity of the plant is 600,000 gallons. The extent of the overload of the plant may be realized, therefore, from the quantity of sewage which it is required to purify. This amount is variously estimated, ranging from 2,000,000 gallons, estimated by the city engineer, to 1,100,000 gallons, estimated by the superintendent at the plant. Considering the lower figure as the one which is the more nearly correct, the plant is receiving about twice its nominal capacity.

This fact, therefore, makes plain the reason for the present condition of the plant and the necessity for constant attention in order that the plant may be operated continuously.

Farm Drains.

During the inspection three farm drains were observed. One of these, located mid-way between the Erie Railroad and Gurley Pike, receives in addition to ordinary ground water, the floor washings from the garbage plant. The second one is located about 100 feet south of Gurley Pike on the south side of the Big Four Railroad. The appearance of

the effluent from this sewer was that of storm water only. The third drain was found about 40 rods south of the Kiener Pike. All of these sewers discharge into Rock Swale and are of the same diameter, 16-inch, vitrified pipe. The flow from the first was very slight, while the third was dry at the time of the inspection.

The above descriptions give in some detail the possible sources of pollution from Marion and its immediate vicinity. The sewage has been traced to points where it is discharged into Rock Swale. A short description will now be given of the condition of Rock Swale, tracing it to the Little Scioto River.

Rock Swale.

Some years ago the county constructed a ditch known as Rock Swale. This ditch, as has already been stated in the preceding paragraphs, receives most of the storm water and all of the sanitary sewage, after passing through the sewage purification plant, of the city of Marion! The ditch flows south and southwest from Silver Street for a distance of approximately three miles before it reaches the Little Scioto River. The condition of the ditch before it reaches Silver Street cannot be said to have an unpolluted appearance. As it flows south, however, its appearance becomes much worse, as from time to time additional quantities of sewage pollution are discharged into it. At Silver Street, where the Silver Street storm sewer discharges into the ditch, large quantities of street washings are deposited, and it is possible that some sanitary sewage enters the stream at this point. The ditch fills rapidly and it is necessary to clean it frequently. Mr. Ullom, supervisor of township ditches, who has this in charge, states that the condition of the ditch just previous to the time when it is cleaned is very serious and that the formation of gas causes the deposited materials to be forced to the surface. This gives the ditch a very black color and perceptible odors. Previous to this inspection the ditch had been cleaned and a large quantity of street washings were piled upon the bank. About 200 feet south of the sewer outfall is located an Italian construction gang, housed in old box cars. The sanitary conditions surrounding this colony are very bad, waste waters and sewage being deposited in Rock Swale. The condition of the bank of the stream underneath the Erie Railroad bridge is serious, owing to the deposit of human excreta. This is deposited upon the surface of the ground until it becomes impassable and then the surface is spaded.

Following Rock Swale south of the Erie Railroad is found the farm drain above mentioned, and this adds to the pollution of the small ditch. The bottom of the stream at this point is covered with black organic deposits, and the mouth of the sewer and stones directly underneath are covered with white and black deposits; characteristic of sanitary sewage. At the point where Rock Swale crosses Gurley Pike and

the outfall sewer from the sewage disposal plant discharges into it, the stream is very noticeably polluted, the black color increasing greatly and the odors being very noticeable. This is especially the case during the night. Farther to the south the organic matter from the sewage collects upon overhanging branches and leaves, forming a thick scum upon the surface of the stream. At other places where the ditch becomes wider and deeper and the stream flow is slight, sedimentation takes place attended by septic action, which continually causes large pieces of deposited sludge to come to the surface of the stream. About one-half mile south of Gurley Pike is the confluence of Slaughter House Ditch with Rock Swale. At this time the flow in the Slaughter House Ditch was very slight and did not show the presence of sewage pollution. The quantity of water reaching Rock Swale from this ditch was so small, however, that its condition was little improved by the dilution. The condition of Rock Swale improves gradually and yet but slightly as it flows to the Little Scioto River, and large quantities of polluted water are therefore discharged directly into the larger stream.

Honey Creek.

Honey Creek, a small stream flowing from the east with its headwaters near Owens Station, receives wastes from gas plants. These wastes are not discharged continuously, but only at infrequent intervals. When they are discharged into the stream, however, they give it a very black color, and it is claimed by farmers living in the vicinity that it is destructive to all fish life. At the time of this inspection the stream flow was small and the water had the appearance of being unpolluted. This stream discharges into the Little Scioto River about 40 rods south of Lowe's Bridge on the Green Camp Pike.

Little Scioto River.

The preceding paragraphs have traced all tributary streams to the points at which they discharge into the Little Scioto River. In a general way the condition of the Little Scioto River will now be discussed. The Little Scioto River has its headwaters near Bucyrus in Crawford County. It flows through a very level country, which has caused the stream to meander greatly, and at the present time the county is at work dredging the stream in order to straighten it, deepen and widen it, so that the flow will be more rapid and more direct to the Scioto River. The headwaters are about 24 miles above its confluence with the Scioto River. The only pollution which the Little Scioto River receives is that coming from Rock Swale, and the old sanitary sewer from Marion, as already described.

Owing to the fact that dredging operations are in progress in the Little Scioto River near its confluence with the Scioto River, the turbidity

of the larger stream is greatly increased. It is hard to determine the quality of the water above the confluence of Rock Swale, but it is safe to say that there is only a very small amount of pollution, if any, reaching the stream. Directly below the confluence of Rock Swale, the condition of the Little Scioto River is very bad. The stream is black and covered with scum. The bottom is covered to a depth of from 2 to 3 feet with thick, slimy sludge, which is forced to the surface continuously by the gas which is generated in the bed of the stream. Its odor is decidedly that of septic sewage, and the stream may be said to be a veritable septic tank. This condition extends south for a distance of at least one-half mile, where it gradually becomes better as the stream flow becomes more rapid.

At the present time the only source of pollution reaching the Little Scioto River is that of the sewage from Marion flowing down Rock Swale and through the old sanitary sewer. The condition gradually improves so that when the water is discharged into the Scioto River there are no physical evidences of sewage pollution. It was claimed, however, by Mr. G. W. Collins, health officer at Green Camp, and by Mr. Summerlot, local merchant, that at the time the health officer made his complaint to the State Board of Health, July 20, 1911, the waters of the Little Scioto River as they were discharged into the Scioto were very black. It was learned from the superintendent of the Marion sewage purification plant that at about this time the septic tanks were cleaned and septic sewage by-passed directly to the outlet sewer. It was not definitely ascertained that the occurrences of cleaning of the tanks and the befouled appearance of the Little Scioto River were related, but it appears quite likely that such was the case.

The conditions of the Scioto River above Green Camp have been discussed in a short paragraph in this report, so that the Scioto River will now be traced from Green Camp as far south as the Girls' Industrial Home.

Green Camp.

Green Camp, a village with a population of 308, is located between the Little Scioto and the Scioto rivers, on the point of ground between their confluence. The village has been slow in regard to public improvements, no paving, sewers, nor public water supply having been installed. The above facts indicate the absence of sanitary plumbing and the general use of outdoor closets. The local drainage is to the Scioto River, but there is little pollution, if any, reaching the same. The village, therefore, may not be considered as a menace to the quality of the Columbus water supply.

Prospect.

Prospect, a village with a population of 945, is located on the Scioto River a few miles below Green Camp. Practically the same conditions prevail at Prospect as at Green Camp as far as sanitary conditions are

concerned. There is, however, more pollution discharged into the river through existing storm sewers and small drains than at Green Camp. The amount of pollution, however, is small in comparison with that which is discharged into the river from the larger localities. It will be necessary for the State Board of Health to keep in touch with conditions at Prospect in order to prevent the discharge of sanitary wastes into the river, thereby polluting the same at this point.

Richwood.

Richwood, a village with a population of 1,728, is located in the eastern portion of Union County. It is not located upon a watercourse and has not installed a system of sanitary sewers. A county ditch, constructed of ordinary drain tile, receives sanitary sewage from several dwellings located in the northeastern portion of the village. This, together with the new storm sewer which was constructed during the past summer, discharges into an open-county ditch which is tributary to Fulton Creek. After flowing a distance of approximately 14 miles, Fulton Creek joins the Scioto River. At the present time the quantity of sanitary sewage discharged into the ditch is so small that there is little danger to the Columbus water supply owing to self-purification in the creek before it reaches the Scioto River.

Magnetic Springs.

The population of Magnetic Springs is 155, increased during the greater portion of the year by an average of about 350 persons, who visit the springs in order to receive the benefits attributed to the magnetic waters. The village is located on Bokes Creek, between 8 and 10 miles above its confluence with the Scioto River. There are no manufacturing interests in the village. The magnetic springs and the benefits derived from the same cause a considerable number of people to visit the village. The accommodation and boarding of the guests constitutes the chief occupation of the residents. The sewage from the village, while dilute, is large in amount, owing to the number of baths taken and the consequent bath wastes being discharged into the sanitary sewers.

To accommodate the guests there are two hotels, two boarding houses, and two bath houses. Besides these, there are eleven private residences connected with the sanitary sewers. The sewage is carried to the creek through one main 16-inch sewer, with three small laterals, the total length being approximately $3\frac{1}{4}$ mile. The creek is small and the flow very slow at this season of the year. At Magnetic Springs the surface is quite level, but as the stream approaches the Scioto the fall becomes more rapid, giving the water a chance for aeration, which aids in the self-purification which takes place in the stream.

The sewage where discharged into the stream has made a considerable deposit of sludge. At the time of the inspection a peculiar pinkish color characterized the sewage discharged into the stream. It would be interesting to make further inspections in order to ascertain whether this fact was purely accidental, or whether some characteristic of the water in its reaction with the sewage forms this peculiarly colored sewage.

Girls' Industrial Home.

Details concerning the quantity and quality of sewage at the Girls' Industrial Home, as well as of the sewage purification plant, may be found in previous reports prepared after special investigations of conditions at the Home. It will be necessary, therefore, at this time, only to mention the fact that during the past summer a systematic repair of the plant has been carried on. These repairs have placed the sewage purification plant in such a condition that with the proper attention which the plant is now receiving and which it is hoped it will continue to receive, it should give a satisfactory effluent and one which in no way can be considered dangerous to the Columbus public water supply.

Mill Creek.

Mill Creek, which receives unpurified sewage from Marysville, was inspected near its confluence with the Scioto River. The condition of the stream at Bellpoint was such that no physical indications were observed of the serious sewage pollution farther upstream, owing to the fact that self-purification has reduced the quantity of suspended matter in the water, leaving the same non-putrescible and odorless.

ANALYSES.

As may be understood from the above paragraphs concerning the various communities and streams which are tributary to the Scioto River, the physical appearances of the stream are such that no direct statement could be made regarding the seriousness of the pollution until after a series of samples have been collected and analyses made. Of course this statement must make the exception of Rock Swale and the Little Scioto River, for these streams contain visible evidence of sewage pollution.

Owing to the difficulty of tracing the sewage pollution in the Scioto River from physical observation, a series of samples were collected at various points along the river. The points were selected with the idea of ascertaining the effects of the discharge of sanitary sewage into the Scioto River and its tributaries and the tracing of the same as far as possible to the Columbus water supply.

The following paragraphs will give in detail the location of the sampling points, which also may be more definitely determined by a study of the maps accompanying this report:

Sampling Points.

- | | | |
|--|----------------------------|----------------------|
| Point No. 1 | Field No. 13 | Laboratory No. 10578 |
| Sample collected from Rock Swale 100 feet north of Silver Street. | | |
| Point No. 2 | Field No. 14 | Laboratory No. 10579 |
| Sample collected from outfall of Silver Street storm sewer. | | |
| Point No. 3 | Field No. 15 | Laboratory No. 10580 |
| Sample collected from Rock Swale 100 feet south of Silver Street. | | |
| Point No. 4 | Field No. 17 | Laboratory No. 10582 |
| Sample collected from Rock Swale 100 feet north of sewer outfall from the Marion sewage disposal plant. | | |
| Point No. 5 | Field No. 16 | Laboratory No. 10581 |
| | Field No. 24 | Laboratory No. 10589 |
| | June 28, 1911, Field No. 1 | Laboratory No. 1131 |
| Sample collected from outfall sewer Marion sewage disposal plant. | | |
| Point No. 6 | Field No. 18 | Laboratory No. 10583 |
| Sample collected from Rock Swale 100 feet south of the sewer outfall from Marion sewage disposal plant. | | |
| Point No. 7 | Field No. 20 | Laboratory No. 10585 |
| Sample collected from Slaughter House Ditch 50 feet above its confluence with Rock Swale. | | |
| Point No. 8 | Field No. 19 | Laboratory No. 10584 |
| Sample collected from Rock Swale 200 feet below the confluence of Slaughter House Ditch. | | |
| Point No. 9 | Field No. 21 | Laboratory No. 10586 |
| Sample collected from Rock Swale 75 feet above its confluence with the Little Scioto River. | | |
| Point No. 10 | Field No. 22 | Laboratory No. 10587 |
| Sample collected from Little Scioto River 100 feet above confluence of Rock Swale. | | |
| Point No. 11 | Field No. 23 | Laboratory No. 10588 |
| Sample collected from the Little Scioto River at Lowe's Bridge on the Green Camp Pike. | | |
| Point No. 12 | Field No. 25 | Laboratory No. 10590 |
| Sample collected from Honey Creek 50 feet above its confluence with the Little Scioto River. | | |
| Point No. 13 | Field No. 26 | Laboratory No. 10591 |
| Sample collected from Little Scioto River at a bridge on the first road running south, west of Lowe's Bridge, about 1½ miles east of Green Camp. | | |
| Point No. 14 | Field No. 27 | Laboratory No. 10592 |
| Sample collected from Little Scioto River at bridge 20 rods above its confluence with the Scioto River. | | |
| Point No. 15 | Field No. 28 | Laboratory No. 10593 |
| Sample collected Scioto River and Green Camp Bridge about 60 rods above the confluence of the Little Scioto River. | | |

Point No. 16 Field No. 29 Laboratory No. 10594
Sample collected from Scioto River where the same approaches the road about mid-way just between Green Camp and Prospect.

Point No. 17 June 28, 1911, Field No. 2 Laboratory No. 1132
Sample collected from Slaughter House Ditch at a bridge on a road running south from the sewage disposal plant.

Point No. 18 June 27, 1911, Field No. 1 Laboratory No. 1133
Sample collected from old sanitary sewer outfall at the Little Scioto River

Point No. 19 July 27, 1911, Field No. 2 Laboratory No. 10547
Sample collected from Little Scioto River 100 feet above its confluence with the Scioto River.

Point No. 20 Field No. 12 Laboratory No. 10577
Sample collected from Scioto River at open bridge about one mile north of Prospect.

Point No. 21 Field No. 11 Laboratory No. 10576
Sample collected from Scioto River at covered bridge one mile south of Prospect.

Point No. 22 Field No. 10 Laboratory No. 10575
Sample collected from Scioto River at bridge $\frac{1}{2}$ mile north of Scioto.

Point No. 23 Field No. 8 Laboratory No. 10573
Sample collected from Bokes Creek at covered bridge $1\frac{1}{2}$ mile north of Warrensburg.

Point No. 24 Field No. 9 Laboratory No. 10574
Sample collected from Scioto River at covered bridge $1\frac{1}{2}$ mile north of Warrensburg below the confluence of Bokes Creek.

Point No. 25 Field No. 7 Laboratory No. 10572
Sample collected from Scioto River at the bridge on the Delaware-Marysville Pike.

Point No. 26 Field No. 6 Laboratory No. 10571
Sample collected from Scioto River at Bellpoint bridge about 300 feet above the confluence of Mill Creek.

Point No. 27 Field No. 4 Laboratory No. 10569
Sample collected from Mill Creek at Bellpoint about 500 feet above its confluence with the Scioto River.

Point No. 28 Field No. 5 Laboratory No. 10570
Sample collected from Scioto River about 500 feet south of the confluence of Mill Creek.

Point No. 29 Field No. 3 Laboratory No. 10568
Sample collected from the Scioto River at covered bridge north of the Girls' Industrial Home.

Point No. 30 Field No. 2 Laboratory No. 1134
Sample collected from outfall of the sewage disposal plant, Girls' Industrial Home.

Point No. 31 Field No. 1 Laboratory No. 10567
Sample collected from Scioto River about 500 feet below the sewage disposal plant at the Girls' Industrial Home.

ANALYTICAL RESULTS.

The analytical results obtained from samples collected at the various points noted above show that Rock Swale above the Silver Street storm sewer is not polluted more than is ordinarily found in surface streams. As it flows to the south and receives the storm water from the Silver Street sewer, the analytical results show the presence of sewage pollution. At the present time the Silver Street sewer contributes a very dilute sewage. The stream gradually purifies itself between Silver Street and the outfall from the sewage disposal plant; but, upon reaching this point, a comparatively large amount of sewage pollution is discharged into it. The amount which is discharged varies between the day and night, owing to the fact that the sewage disposal plant is not properly operated during the latter period. The effects of this lack of operation are clearly shown by the analytical results. Self-purification again takes place in Rock Swale, as it does in all of the streams sampled, as it flows slowly along its course. The frequent discharge into the streams, however, of sanitary wastes, are clearly evidenced by the analytical results. These results show that Slaughter House Ditch carries a small amount of sewage pollution. The condition of Rock Swale is improved but slightly as it approaches the Little Scioto River, and even at the confluence carries a considerable quantity of suspended matter.

The Little Scioto River above the confluence with Rock Swale, carries some sewage pollution which is hard to estimate and the source of which is hard to locate, owing to the fact that the stream is being dredged about two miles above this point. The condition of the stream below the confluence of Rock Swale is shown to be very serious owing to the deposition of large quantities of organic matter forming a heavy sludge in the bottom of the stream, causing the same to be not only seriously charged with sulphuretted hydrogen, but also to be putrescible. Honey Creek adds but a very small amount of pollution at the present time. The condition of the Little Scioto River gradually improves as it approaches the Scioto River.

The Scioto River, while showing the presence of sewage pollution above the confluence of the Little Scioto, receives a large quantity from the latter stream. These facts are evidenced by the analytical results obtained from the samples collected. The Scioto River is in turn subject to self-purification, and the effects of the sewage-laden streams discharging into the Scioto River are gradually counteracted by this process as the stream flows toward Columbus. The large number of tributary streams and the amount of sewage pollution discharged into the Scioto from each, however, continually adds to the pollution of the Scioto to such an extent that the self-purification is unable to produce sufficient change in the water to enable it to be considered safe and not a menace to the Columbus supply.

SUMMARY.

On April 24th, 1911, a Bense Act petition was received from the city of Columbus, asking for an investigation of the Scioto River, including an inspection of sewage conditions at several communities located upon the watershed. Following this petition several letters were received from different villages upon the watershed, complaining of the unsanitary conditions. It was the result of these requests that this investigation was made.

The Scioto River was inspected upon two different occasions, the first on July 27-28, and the second on August 1-2, 1911. At the latter time a series of samples was collected. The investigation included an inspection of the Scioto River from the Girls' Industrial Home to Green Camp, and the Little Scioto and Rock Swale to Marion; with samples collected from Honey Creek, Bokes Creek and Mill Creek. A careful investigation of sewerage conditions was made at Marion, Richwood and Magnetic Springs.

It was ascertained during these investigations that the sewage purification plant at Marion was being overworked, and that a certain amount of sanitary sewage was being discharged into Bokes Creek by the village of Magnetic Springs. Some sewage from Richwood was being discharged into county ditches which reaches the Scioto River through Fulton Creek. The most serious conditions observed were those found in the Little Scioto River below the confluence of Rock Swale. At this point a large quantity of sanitary sewage had been discharged into the stream, causing the deposit of a large amount of organic matter. It was also ascertained that wastes from gas plants are discharged into Honey Creek, which is tributary to the Little Scioto River. The physical appearance of the tributary streams other than those already mentioned was excellent.

The analytical results obtained from a series of samples collected from various points along the Scioto River indicate that the river is subject to more or less sewage pollution at all times. There is, however, a large amount of self-purification taking place in the streams, which is at a maximum during extreme dry weather. It should be noted, however, that with increased flow of the streams, this self-purification will not be so evident. The discharge, therefore, of the sewage into the tributary streams may be considered a menace to the Columbus water supply, since at high water the deposits will be carried by the rapidly flowing water directly to the Columbus supply without sufficient time for self-purification.

A copy of this report was furnished the superintendent of water works at Columbus and attention called to the fact that no analytical evidence was obtained which would prove that the sewage from the various municipalities complained of affected the quality of the Scioto

River at Columbus, although pollution was traced for distances of several miles below some of the sewer outlets. The fact, however, that there existed on the watershed above Columbus a total population of some 80,000, about one-half of which lived in cities and villages, indicated the possibility that during times of freshets, unpurified sewage of a dangerous character could be rapidly carried to the Columbus water supply intake and thus place an increased responsibility upon the water purification plant, and that while it would seem reasonable to expect the various cities and villages above Columbus to purify their sewage to such a degree that the quality of the river water below their outlets would not be noticeably, if any, worse than the quality above such outlets, until the constitutionality of the Bense Act had been passed upon by the Supreme Court the State Board of Health could not proceed under this act to compel these municipalities to purify their sewage.

The authorities at Marion were notified that their sewage purification plant had been found to be inadequate and that serious pollution of the Scioto River resulted; that steps should be taken at once to enlarge the plant, and that immediate improvement could be secured by providing for continuous attendance day and night so that the filters could be kept sufficiently clean to enable most, or practically all, of the sewage to be passed through them, thus avoiding the necessity of by-passing the sewage to the river.

As foul and putrescible material, apparently originating from sanitary connections, was found to be discharged from the storm sewer at Silver Street, they were advised that they should make a careful search for such connections and remove any found.

EXAMINATION OF WATER FROM SCIOTO RIVER AND TRIBUTARIES.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10571	1911 Aug. 1					4.6	6.75		trace	
10569	Aug. 1					4.5	5.25		trace	
10570	Aug. 1					4.2	8.75		trace	
10568	Aug. 1					4.45	7.75		trace	
1134	Aug. 1			7.87		4.9	8.25			
10567	Aug. 1					4.55	7.5		trace	

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10571	11.0	.....	.....	.....	.....	.....	.....	4500	In 1 cc.
10569	10.5	.....	.....	.....	.....	.....	.....	1080	In 1 cc.
10570	12.5	.....	.....	.....	.....	.....	.....	5000	In 10 cc.
10568	7.5	.....	.....	.....	.....	.....	.....	1500	In 1 cc.
1134	.....	.....	.....	.....	735	170	.....	260000	In 1 cc.
10567	8.0	.....	.....	.....	.....	.....	.....	4,200	In 0.1 cc.

Note:—A list of sampling points will be found on page 395.

EXAMINATION OF WATER FROM SCIOTO RIVER AND TRIBUTARIES.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Total Kjeldahl.	Free Ammonia.	Nitrites.	Nitrates.
10577	1911 Aug. 1					5.15	5.0		.001	
10576	Aug. 1					4.35	5.5		trace	
10575	Aug. 1					4.45	6.0		trace	
10573	Aug. 1					7.15	5.0		trace	
10574	Aug. 1					4.1	6.5		trace	
10572	Aug. 1					4.6	6.0		.008	

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10577	18.	.....	.....	.....	.....	.....	.....	432	In 10 cc.
10576	23.	.....	.....	.....	.....	.....	.....	4500	In 1 cc.
10575	18.	.....	.....	.....	.....	.....	.....	8690	In 1 cc.
10573	2.0	.....	.....	.....	.....	.....	.....	375	In 1 cc.
10574	18.5	.....	.....	.....	.....	.....	.....	2000	In 1 cc.
10572	17.0	.....	.....	.....	.....	.....	.....	3750	In 10 cc.

Note:—A list of sampling points will be found on page 395.

EXAMINATION OF WATER FROM SCIOTO RIVER AND TRIBUTARIES.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Total Kjeldahl.	Free Ammonia.	Nitrites.	Nitrates.
10578	1911 Aug. 1					3.48	5.25		trace	
10579	Aug. 1					2.55	7.25		.0036	
10580	Aug. 1					8.7	6.0		.0016	
10582	Aug. 1					3.77	5.25		.007	
10581	Aug. 1					6.27	31.25		trace	
10589	Aug. 2					6.76	14.25		.035	
1131	June 23	Bacterial sample only.								

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10578	3	.....	.....	.....	322	33	.....	9720	In 10 cc.
10579	100	.....	.....	.....	815	96	.....	5400	In 0.1 cc.
10580	70	.....	.....	.....	644	67	.....	21600	In 1 cc.
10582	70	.....	.....	.....	655	65	.....	22560	In 0.1 cc.
10581	110	.....	.....	.....	922	69	.....	27000	In 1 cc.
10589	200	.....	.....	.....	1733	690	.....	10800	In 1 cc.
1131	.....	.....	.....	.....	.....	.....	.....	60000	In 1-100 cc.

Note:—A list of sampling points will be found on page 395.

EXAMINATION OF WATER FROM SCIOTO RIVER AND TRIBUTARIES.

PARTS PER MILLION.

Sample Number.	Collected	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Total Kjeldahl.	Free Ammonia.	Nitrites.	Nitrates.
10583	1911 Aug. 1					7.65	18.75		trace	
10585	Aug. 1					3.62	7.0		.040	
10584	Aug. 1					4.0	16.25		.009	
10586	Aug. 1					4.4	15.51		.015	
10587	Aug. 2					5.55	10.75		.030	
10588	Aug. 2					22.35	29.5		.008	
10590	Aug. 2					.68	3.5		trace	

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10583	80.	.....	.....	.....	825	72	.....	16200	In 1 cc.
10585	80.	.....	.....	.....	787	75	.....	2040	In 0.1 cc.
10584	80.	.....	.....	.....	737	66	.....	8640	In 0.1 cc.
10586	110.	.....	.....	.....	.....	.....	.....	7200	In 1 cc.
10587	70.	.....	.....	.....	.....	.....	.....	4320	In 0.1 cc.
10588	100.	.....	.....	.....	.....	.....	.....	14040	In 0.1 cc.
10590	4.0	.....	.....	.....	.....	.....	.....	3240	In 0.1 cc.

Note:—A list of sampling points will be found on page 395.

EXAMINATION OF WATER FROM SCIOTO RIVER AND TRIBUTARIES.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Total Kjeldahl.	Free Ammonia.	Nitrites.	Nitrates.
	1911									
10591	Aug. 2					3.62	5.25		.009	
10592	Aug. 2					5.48	5.5		0	
10593	Aug. 2					3.72	4.25		.045	
10594	Aug. 2					6.07	6.5		.008	
1132	June 28									
1133	July 27					5.95	27.5	.950	.020	.8
10547	July 27	Bacterial sample only.					Alb.			
						4.38	Am.			
							.428			

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates.	Residue on Evaporation		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
10591	80.	.....	.....	.....	.....	.....	.....	4320	In 10 cc.
10592	65.	.....	.....	.....	.....	.....	.....	3500	In 1 cc.
10593	20.	.....	.....	.....	.....	.....	.....	4320	In 10 cc.
10594	26.	.....	.....	.....	.....	.....	.....	7200	In 1 cc.
1132	.....	.....	.....	.....	.....	.....	.....	80000	In 1-100 cc.
1133	.....	.....	.....	.....	Tot. 965	Tot. 69	.7	7000	In 10 cc.
					Dis. 959	Dis. 85			
10547	.....	.....	.....	.....	684	84	3.2	2500	Not in 10 cc.

Note:—A list of sampling points will be found on page 395.

REPORT ON INVESTIGATION OF THE POLLUTION OF TURKEY FOOT CREEK BY THE SEWAGE OF THE VILLAGE OF WAUSEON.

On May 31st, 1911, there was received from Mr. George E. Gorsuch, clerk of Clinton Township, Fulton County, a Bense Act complaint against the discharge of sewage from the village of Wauseon into Turkey Foot Creek. On the same date a similar complaint was received from Mr. George A. Everett, clerk of York Township, Fulton County, against the discharge of milky wastes from the Van Camp Packing Company's plant in the village of Wauseon.

These complaints were referred to the Board at its meeting held June 1st, 1911, and Dr. Oscar Hasencamp, member, and R. Winthrop Pratt, chief engineer, were appointed a committee to investigate the complaints and report upon conditions found. The chief engineer visited Wauseon on July 6th, 1911.

In view of local circumstances, and also because the constitutionality of the Bense Act had been rendered doubtful by a recent court decision, it was decided to recommend that the Board act in this case under its general powers.

The following report was submitted:

Wauseon is a village of about 2,500 inhabitants located in Fulton County, of which it is the county seat. The topography in the vicinity is quite flat but the natural drainage passes into Turkey Foot Creek which enters the Maumee River below Napoleon.

The village has a public water supply derived from wells located a mile south of the village. The water is very generally used and modern plumbing has been installed in most of the houses. At present there are about eight miles of combined sewers which discharge into Turkey Foot Creek or into ditches leading thereto. The village sewerage may be described in a general way as follows:

The sewage from the northerly portion of the village lying north of the Lake Shore and Michigan Southern Railroad tracks, which at the present time contains probably three-fourths of the population, is collected by a 10 or 12-inch sewer which discharges into Turkey Foot Creek at the easterly corporation line. The main sewer and outlet were built in 1906 or 1907 without receiving the approval of the State Board of Health. This was done in spite of the fact that in 1905 the attention of the village was called to the unsanitary conditions of the then existing sewer system and a recommendation made for sewage purification.

The outlet at present receives the sewage of probably 1,200 people and at the time of inspection the rate of flow appeared to be 80,000 to 100,000 gallons per day. The small stream at and below the outlet was most offensively polluted with sewage and sludge in various stages of

decomposition. It was stated that no complaint had been made by the owner of the land on which the outlet is located for the reason that said owner is furnished with water from the village and is allowed to keep hogs within the village limits, and to feed them on offal collected about the village.

The portion of the village which lies south of the railroad, which is more sparsely settled but which contains the Van Camp Packing Company's plant, is supplied with four sewer outlets. Two of these, in the southeasterly portion of the village, discharge into a county ditch, known as Ditch No. 251. These sewers together receive the sewage from some 50 houses and there has resulted a pollution of the ditch below the outlet. In response to a recent complaint against one of these outlets, council has just ordered the cleaning of the ditch.

In the southeasterly portion of the village there are two sewers which discharge, just outside the corporation line into a small ditch leading into Turkey Foot Creek. At the time of inspection in 1905 there was one outlet at this place; and at that time it was proposed to build another sewer and establish another outlet in order to accommodate the houses in Chestnut Street, as well as to take the wastes from the Van Camp Packing Company's plant.

After investigation this plan was disapproved by the State Board of Health, but the village not being willing to comply with the action of the Board, constructed, in effect, the proposed sewer, except that the same was arranged to discharge through the existing Leggett Street outlet instead of at a new outlet. More recently, however, it was found that this construction (made in order to keep the matter out of the hands of the State Board of Health by using an old outlet) proved to be impracticable because the old sewer caused the new sewer above the junction to back up into the houses. Consequently, without the Board's approval, a new outlet was established some two years ago from the Leggett Street sewer, this outlet being into the same ditch and about 50 feet above the old Leggett Street outlet, into which is now discharged the wastes of the canning factory.

At the time of inspection, it was found that the ditch receiving the discharge from these two outlets was most offensively polluted with a mixture of putrefying sewage and milk. It was, moreover, reported that during the last month or six weeks great quantities of sour milk had been discharged from the canning factory into this ditch and the stench had become unbearable.

An inspection was made of the Van Camp Packing Company's plant which is devoted entirely to the manufacture of condensed milk, and it was learned that some 100,000 pounds of milk per day are condensed. The plant is kept scrupulously clean in the interior and the waste wash water from the various apparatus is discharged into the stream. This

is at times a dilute milk and, of course, on standing in the ditch rapidly putrefies and becomes offensive.

The fact that the canning factory discharges all its wastes through the village sewer, places the responsibility for the resulting nuisance upon the village authorities. If the authorities wish to avoid this responsibility they can, of course, direct the canning factory to disconnect from the sewer and provide for the purification of its own wastes. The village authorities do not, however, apparently wish to do this.

SUMMARY AND RECOMMENDATIONS.

It was found on investigation that the complaints of Mr. George R. Gorsuch, clerk of Clinton Township, and of Mr. George A. Everett, clerk of York Township, Fulton County, were amply justified; and that the village of Wauseon was maintaining five separate sewer outlets all of which were causing a greater or less nuisance.

Two of these outlets, that from the northerly part of the village, and also the new Leggett Street outlet, were established about five years ago in direct violation of the State law, which at that time provided that "No city, village, corporation, or person shall * * * introduce a system of sewerage or change or extend any * * * outlet of any system of sewerage * * * unless the proposed outlet * * * shall first have been submitted to and received the approval of the State Board of Health."

The village officials should, therefore, be notified that they have installed, contrary to law, two sewer outlets discharging into Turkey Foot Creek or branches thereof, and that these outlets are now the cause of unsanitary conditions detrimental to the health and comfort of persons living in Clinton and York townships below the village. The attention of the village officials should be called to the fact that in 1905 the village was advised by the State Board of Health "that the present method of disposing of the sewage of Wauseon is dangerous to the health of the inhabitants of the village, as well as to persons living along the creek below the village, and that plans satisfactory to the State Board of Health, for a proper system of sewerage for house sewage only, including a provision for sewage purification, should be prepared and that all future sewers should be built in accordance with this plan. The village should be further advised that the use of the present sewers for domestic sewage should, as fast as practicable, be discontinued and the houses now discharging therein should be connected to proper domestic sewers leading to a purification plant. The present sewers could be, unobjectionably, continued in use as storm sewers."

This advice should be repeated at the present time. Furthermore, it should be made clear that the wastes from the Van Camp Packing Company's plant, which are largely the cause of present offensive con-

ditions as regards the creation of odors, is connected with the village sewer and that the village is responsible for damages arising therefrom.

At the meeting of the State Board of Health held September 14th, 1911, this report was adopted and the Board reaffirmed the advice given to the village in 1905, quoted above, and the Secretary was instructed to so notify the mayor and council of Wauseon.

The mayor and council of Wauseon were notified of the Board's action, and a copy of the letter was furnished the clerk of Clinton and the clerk of York townships.

REPORT OF AN INVESTIGATION OF THE PUBLIC WATER SUPPLY OF ZANESVILLE.

On March 14th, 1911, there was received from Dr. G. W. McCormick, health officer of Zanesville, the following petition:

"To the Ohio State Board of Health:

I, the undersigned, being the duly elected and qualified health officer of the city of Zanesville, Muskingum County, State of Ohio, do hereby make complaint that, in my opinion and belief, the public water supply of Zanesville, located in Muskingum County, Ohio, is impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said city of Zanesville, Muskingum County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical to require said city of Zanesville to secure a new source of water supply, or to install and place in operation, water purification works to purify said existing public supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) G. W. McCORMICK.
Health Officer.

Dated at Zanesville, Ohio, this 13th day of March, 1911."

At a meeting of the State Board of Health held March 18th, 1911, the following report of the chief engineer, R. Winthrop Pratt, was considered:

EVIDENCE BASED ON PAST EXAMINATIONS OF THE STATE BOARD OF HEALTH RELATING TO THE IMPURITY AND DANGER TO HEALTH OF THE ZANESVILLE WATER SUPPLY.

I. Investigation by the Board has shown that there are some twenty-seven cities and villages, having an aggregate population of nearly 200,000 which are located along the Muskingum River and tributaries above Zanesville. A considerable number of these cities have sewer systems which discharge unpurified sewage from a certain portion of the inhabitants into the river.

2. The chief engineer of the State Board of Health has personally observed that during low stages of the river the velocity of flow above the Zanesville dam is so small that the river for several miles above Zanesville is in effect a pond or lake. Under these conditions a wind blowing from a southerly direction may readily cause the sewage, from certain sewer outlets above the dam, to pass upstream and into the water works intake. On one occasion a float was thrown into the river by the chief engineer near one of the east side sewer outlets, a short distance below the water intake, was seen to pass upstream toward the intake at a fairly rapid rate due to a southerly wind.

3. The following table shows the number of deaths from typhoid fever and the rate per 100,000 population, as far as the statistics are available. This rate is from three to six times as high as is necessary as shown by the following table which compares the Zanesville typhoid fever death rate to other Ohio cities of about the same size having safe water supplies.

TYPHOID DEATH RATE PER 100,000.

Mansfield	36
Postoria	32
Hamilton	31
Massillon	31
Newark	29
Tiffin	26
Mt. Vernon	15
ZANESVILLE	90

4. Based on some twenty-five or more analyses of the river made by the State Board of Health during the past twelve years, it is clear that, from a chemical and bacteriological standpoint, the water is impure and dangerous to health.

After giving the authorities an opportunity to be heard, the report of the chief engineer was adopted and the following order was sent to the mayor and council and the director of public service, March 20th, 1911:

ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF
ZANESVILLE.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions in the city of Zanesville, Muskingum County, Ohio, as set forth in the complaint, in writing, made to said State Board of Health by the health officer of the city of Zanesville, Muskingum County, Ohio, as required by Section 2 of an Act of the General Assembly of Ohio, entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution," passed April 7th, 1908 (99 O. L. p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the public water supply of Zanesville is impure and dangerous to health and that it is not possible to sufficiently eliminate the sources of pollution now affecting it, and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 18th day of March, 1911, notified the director of public service of the city of Zanesville of its said findings, and gave the said city an opportunity through him to be heard on the 18th day of March, 1911, and

WHEREAS, On the 18th day of March, 1911, pursuant to said notice, there appeared before the State Board of Health Mr. Earl E. Everitt, director of public service, and

WHEREAS, the said Earl E. Everitt in the presence of said State Board of Health discussed the matter contained in said complaint and admitted that the present public water supply of Zanesville is impure, and furthermore presented a resolution adopted by the city council of Zanesville, authorizing him to represent the said city council in discussing said complaint before the State Board of Health, and

THEREUPON, After such hearing and argument, the State Board of Health found and determined that the following improvements or changes in said conditions aforesaid were necessary and should be made, to-wit: That, the city of Zanesville should be required to secure a new source of public water supply and place the same in use by January 1st, 1912; or install and place in operation water purification works, satisfactory to the State Board of Health, to purify the present supply, by January 1st, 1912.

THEREUPON, On motion duly seconded, the report and findings of said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

March 20th, 1911.

(Signed) C. O. PROBST,
*Secretary of State Board of Health
of the State of Ohio.*

COLUMBUS, OHIO, March 20th, 1911.

The foregoing report and findings having been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 20th day of March, 1911.

(Signed) JUDSON HARMON,
Governor of Ohio.

(Signed) TIMOTHY S. HOGAN,
Attorney General of Ohio

MISCELLANEOUS REPORTS

(411)

REPORT RELATIVE TO SANITARY CONDITIONS GOVERNING BATHING IN LAKE ERIE WITHIN THE CITY LIMITS OF CLEVELAND.

On July 20th, 1911, at the request of Dr. C. E. Ford, secretary of the board of health, Cleveland, the chief engineer made an inspection of conditions affecting bathing at Euclid Beach Park and Beulah Park.

The Cleveland intercepting sewer, which, at the present time is said to receive at least one-third of the sewage of the city, discharges into the lake at a point near Collinwood. The outlet is extended by means of an iron pipe and discharges about 1000 feet from the shore. On the beach, however, at the edge of the lake, where there has been erected a settling tank, for the purpose of removing grossly suspended solids, it was found on the day of inspection that a considerable stream of sewage was flowing over the beach into the lake.

About one mile east of the sewer outlet are located Beulah Park and Euclid Beach Park, at which points large numbers of people bathe in the lake. At both of these parks the lake water is polluted by local sewage discharged in close proximity to the bathers. Furthermore, under certain conditions, it is very probable that some of the city sewage is carried to the bathing beaches. The reasonable probability of this may be realized when it is considered that a lake current of four miles an hour flowing toward the east would convey the sewage from the city outlet to Euclid Beach Park in about one hour; and that in this time there would be comparatively little opportunity for dilution or purification of the sewage.

As has generally been observed, it is the usual thing for a bather when swimming, to take more or less water into the mouth. If this water is contaminated by sewage the chances for infection by typhoid or other water borne disease germs are great.

The conditions governing bathing at Cleveland, therefore, as shown by the inspection, are such as to offer a decided menace to the health of the bathers; and as a matter of protection to the public health it would seem that bathing in the lake at such points as are found to be contaminated by sewage from the city or elsewhere should be prohibited.

ACTION OF THE BOARD.

At a meeting held September 14th, 1911, this report was considered and adopted, and the Secretary was instructed to send a copy to the board of health of Cleveland.

REPORT ON INVESTIGATION OF POLLUTION OF MORGAN RUN, AT CLEVELAND.

On May 6th, 1911, there was received from Mr. F. H. Eggers, a citizen of Cleveland residing near the corner of Jennings Avenue and Valley Road in the southerly portion of the city, the following communication:

"CLEVELAND, May 4th, 1911.

To the Honorable State Board of Health, Columbus, Ohio.

GENTLEMEN: Kindly permit me to call your attention to one of the greatest and most abominable nuisances in the city of Cleveland. Morgan Run from the Cuyahoga River to Broadway is the receptacle for a great number of local sewers where its inhabitants are about 80,000 people, (mostly the better class of people) that own their little homes. The stench that emanates from this run is no only unbearable but very injurious to health. The citizens have urged the city government for the last five years to build an interceptor but have failed. It is impossible to get relief from the city authorities. Will you kindly give this nuisance your immediate attention. I would be pleased to accompany your representative on the inspection.

Very respectfully yours,

(Signed) F. H. EGGERS."

At the meeting of the State Board of Health held May 10th, 1911, the above complaint was referred to a committee consisting of Dr. Miller, president, and the chief engineer. This committee made an investigation on May 18th, 1911, and submitted the following report:

Morgan Run, so-called, is a small tributary of the Cuyahoga River located within the city limits of Cleveland. From information obtained from the city engineer, it has a watershed of 2350 acres, about half of which is provided with sewers. The city engineer and health officer of Cleveland, who are familiar with this territory, believe that the population per acre on this sewered area is not more than 15, in which case there could not be more than 18,000 people discharging sewage into the stream, instead of 80,000 as claimed by the complainant.

There are three large city sewers which constitute the principal source of pollution of Morgan Run. Two of these are located in East Forty-ninth Street and one in East Sixty-fifth Street. Into one of these sewers are discharged the wool washing wastes of the Cleveland Worsted Mills, located on Broadway. These wastes are more offensive in character, after putrefaction has begun, than ordinary domestic sewage. A careful inspection was made of the stream at and below the Forty-ninth Street sewer outlets, but at the time of inspection no offensive odors could be detected. It is probable, however, that after continued warm weather and during certain atmospheric conditions, odors are caused by

the putrefying sewage and woolen mill wastes in the run; but the fact that the stream is in a deep valley several hundred feet below the average level of the residence property, would seem to indicate that the nuisance could not extend over a great area.

The only remedy for the existing conditions would be to build an intercepting sewer in the valley of Morgan Run, connecting same with the main Cleveland interceptor. This improvement is included in the plans for proposed improved sewerage for the city, and the city engineer states that it will be undertaken as soon as the city council appropriates the necessary funds.

The local health officials state that there are several portions of the city, similar to the Morgan Run district, where sewers are badly needed, and that council has been urged to provide sewerage for such districts.

The conditions complained of would seem to be a matter which should and will be settled by the city authorities of Cleveland.

ACTION OF THE BOARD.

At a meeting held June 1st, 1911, this report was adopted and the Secretary was instructed to call the attention of the mayor and council and the board of health of Cleveland to the desirability of providing proper sewerage for the Morgan Run district as soon as possible.

REPORT IN REGARD TO SHORTAGE OF WATER AT THE OHIO STATE SANATORIUM.

During the fall of 1910, the water supply of the Ohio State Sanatorium gradually began to fail to meet the demands imposed by the institution. Consequently, one of the assistant engineers visited Mt. Vernon for the purpose of ascertaining if possible the cause of this shortage and also if possible to find some remedy. During this visit information and assistance were rendered by Dr. C. B. Conwell, superintendent of the sanatorium, Mr. Thompson, chief engineer, and Mr. Close, the electrician. The following report was subsequently submitted:

Before discussing the shortage of the supply, it will be well to give a brief description of the source and of the method of development. The water supply for the Ohio State Sanatorium is obtained from three springs, which outcrop at the foot of the hill on which the institutional buildings are located. The original flow of water from these springs was about 120,000 gallons per day. In developing this source of supply a concrete basin was constructed around the original point of outcrop of the springs. This basin is about 80 feet by 30 feet in plan, and has a maximum flow line depth of about 5 feet. The basin is formed on two sides by a substantial concrete wall. On the other two sides is a retain-

ing wall built of loose field stone, this retaining wall serving to keep loose surface material from caving in. The floor of the basin is covered with concrete to facilitate cleaning. The water from the springs originally had a free outlet at elevation 248 feet. The development of the springs by the construction of the basins has resulted in a raising of the water level and thereby placing a resistance against the free flow of water from the spring. Since the outlet of the basin is at elevation 251 this resistance has a minimum value of 3 feet and a maximum value of about 5 feet of head. Recently a new point of outcrop of water has developed. This point is just west of the concrete wall forming the basin. A rough gaging of the amount of water flowing from this point showed that about 37,000 gallons were escaping here daily. It is presumable that this water is a part of that which formerly discharged from the three original springs, and therefore that the yield of these springs is decreased by at least this amount.

The water from the basin flows through a 12-inch vitrified tile drain, 900 feet long to a collecting well at the pumping station. This drain is said to be encased with 6 inches of concrete. A considerable part of the length of this drain was laid in a wet ditch, and as no particular precautions were taken to keep the water away from the concrete during the time required for it to set, the cement was washed out at several points and a watertight conduit was not obtained as was intended. A considerable amount of water enters this conduit, at one point about 300 feet from the well where the ditch was particularly wet and it is presumable that a large part of the leakage enters here. This leakage is objectionable from the point of view of the quality of the supply rather than of the quantity and will be discussed later.

The collecting well at the pumping station is 30 feet in diameter by 24 feet deep and has a flow line capacity of about 120,000 gallons. The overflow of this well is set at elevation 253 or 2 feet above the outlet of the spring basin. Until recently the water level has been at or near the point of overflow. For two or three months, however, the amount of water pumped from the well has exceeded the inflow from the spring and the level, therefore, has fallen until at the time of the visit the water stood about 8 feet below the overflow. The water from the well is pumped by an electrically driven triplex Deming plunger pump. The discharge from this pump is directly into the distribution system.

A standpipe on the system furnishes about 100,000 gallons storage and is filled by the excess of water pumped over the consumption. A float in the standpipe operates an electrical starting device which controls the motor on the pump. This float control permits only a small variation in the water level in the standpipe.

The following table is prepared from the dial of the recording water pressure gage on which the small change of pressure caused by the starting and stopping of the pump is readily detectable,

<i>Pump Started.</i>	<i>Pump Stopped.</i>	<i>Duration of Pumping.</i>	<i>Interval Since Previous Pumping.</i>
7:12 A. M.	7:25 A. M.	13 min.	..
8:15	8:52	37	50
9:20	9:55	35	28
10:25	11:05	40	30
11:40	12:30 P. M.	50	35
1:10 P. M.	1:40	30	40
2:30	3:00	30	50
3:35	4:00	25	35
4:45	5:15	30	45
6:37	7:35	58	82
8:20	8:52	32	45
9:35	10:00	25	43
10:40	11:07	27	40
11:55	12:20	25	48
1:15 A. M.	1:45	30	55
2:30	3:00	30	45
3:50	4:15	25	50
5:05	5:35	30	50
6:20	5:52	32	45

Total..... 604 min.

This table shows that the pump operates for nearly as long periods and with nearly the same frequency at night as during the day. Between midnight and 5:00 A. M. the average interval between pumpings is 49 minutes. Since the water level in the storage reservoir lowers 5 1-8 inches during this period the outflow is 2,265 gallons which is equivalent to a rate of outflow of 2,770 gallons per hour, or 66,500 gallons in 24 hours. The average night period of pumping is 28 minutes. During this time the outflow from the standpipe is 1,292 gallons, and the gross inflow or pumpage is 3,557 gallons which is equivalent to a rate of pumpage of 7,530 gallons per hour. The theoretical pump capacity is 8,460 gallons per hour and the slip therefore is about 11 per cent. from the pumping records shown above the total amount of water pumped on December 20, 1909, deducting slippage, was 75,800 gallons. The difference between the total amount of water pumped and the amount of water which is wasted at a uniform rate night and day, may safely be taken as the amount of water which is put to useful purposes by the inmates of the institution and by the employees. This difference on December 20th was 9,300 gallons, or 12.3 per cent of the amount of water pumped. This amount covers the water used for flushing closets, for washing and bathing, for laundry purposes and for various uses in the kitchen.

A conservative estimate of the amount of water used at the power house is 200 gallons per hour, or 4,800 gallons per day. One sewer flush tank requires daily about 1,200 gallons of water. About 500 gallons are required at the sewage disposal plant. Deducting from the

total pumpage the amount of water used in the various buildings, at the power house, in the flush tank and at the sewage disposal area, it will be seen that on December 20th, about 60,000 gallons of water was being used at a uniform rate both night and day and was apparently serving no good purpose. During the assistant engineer's visit an attempt was made to locate this heavy and unprofitable use of water. Some gross wastes were located but a sufficient amount to account for the whole amount was not found. In the administration building, the employes building, the two receiving cottages, and at the disposal plant, a continuous use of water at the rate of 23,750 gallons was noted. By a few changes in plumbing fixtures this use of water could be decreased about 20,000 gallons. The total amount of water running to waste includes the following items:

<i>Location of Leak.</i>	<i>Amount of Leakage.</i>
Administration building—	
Faucet in drug room.....	300 gallons.
Faucet in second floor toilet room.....	1,450 "
Automatic urinal in basement.....	575 "
Automatic urinal in toilet room opposite office.....	650 "
Automatic urinal on second floor.....	275 "
Automatic urinal in barber shop.....	...
Employes' building and cottages—	
Eight drinking fountains.....	16,500 "
Sewage disposal plant—	
Open valves to prevent freezing.....	4,000 "
Total waste accounted for.....	23,750 "

Deducting this amount from the total waste (60,000 gallons), there still remains somewhat over 36,000 gallons unaccounted for. Two long exposed water lines, one to the barn and the other to the shacks, in the past have been left open to prevent freezing, but at the time of the visit these were reported to be closed. It is possible however, that on December 20th, these lines were open and therefore they may in part account for the additional waste. If this is not the case a further and more exhaustive search should be made within the buildings in the hope of revealing additional wastes not noted at the time of this visit. It is probable, however, that this search would be rather fruitless and that the unaccountable waste occurs either along the lines of mains or at the standpipe, and probably at this latter point. The standpipe was noted to be in very bad condition and to be leaking considerably. The leakage, however, could not be measured because it was impossible to shut the standpipe off from the distribution system and to pump directly into the mains for any appreciable time.

SUMMARY AND CONCLUSIONS.

The original flow of water from the springs was 120,000 gallons per day. This flow is not now available, because the raising of the level of the water in the collecting basin has caused a decided falling off in the yield of the springs. The best available estimate indicates that the springs now yield between 75,000 and 80,000 gallons a day showing a decrease of 45,000 gallons in 24 hours. Most of this quantity is apparently now outcropping at a lower elevation west of the basin. The yield of the spring may undoubtedly be materially increased by lowering the water level to the original elevation. To do this it will be necessary to relay the existing pipe line, or better to lay a new line from the basin to the pump well at a lower elevation. This new line should be of cast iron bell and spigot pipe 6 inches in diameter and with leaded joints. The invert of this pipe, at the basin, should be at or below the bottom of the basin and should slope with a uniform grade of at least 0.1 per cent. toward the collecting well. This new line should be provided with two inlets from the basin, one drawing water from at or near the bottom of the basin and the other from an elevation from about 30 inches above the bottom. The lower inlet should be provided with a valve which should only be opened when an insufficient amount of water is obtainable through the upper inlet. This improvement is very desirable, although not absolutely necessary, because even the present yield of the spring is amply sufficient to meet all reasonable demands of the institution.

At present a great part of the water pumped into the distribution system is lost. If the present rate of loss is permitted even the increased yield to be obtained by providing a new pipe line will in the near future be insufficient to meet these excessive and unreasonable demands.

The gross loss of water seems to be divided into two parts:

1st. A gross waste within the buildings and about the grounds, which has been located and measured and which may be eliminated by a few minor changes in the plumbing fixtures; and,

2nd. An even greater waste which has not been located and has been estimated only by the process of elimination. This second waste is probably due to leakage from the standpipe or to leaks on the distribution system. The following summary shows the amount of water needed for all reasonable demands of the institution and also the amount of water at present going to waste in an unwarranted manner.

	<i>Gallons.</i>	
Total average present daily pumpage.....		75,500
Liberal allowance for all reasonable uses in buildings,		
laundry, kitchen, etc.....	12,000	
Liberal allowance for all purposes at the power house.....	5,000	
Flush tanks and sewage disposal area.....	1,500	
	<hr/>	
Total requirement of institution.....	18,500	18,500

	<i>Gallons.</i>
Unwarranted waste	57,000
Waste which may be eliminated by changes in plumbing fixtures	21,000
	<hr/>
Waste unaccounted for.....	36,000

This last unaccountable loss should be located by a rigid inspection, an examination of the entire distribution system and standpipe, and the necessary repairs should subsequently be made.

To eliminate the waste which has been located within the buildings and about the grounds the following changes should be made in the plumbing fixtures:

- 1st. Spring pinch cocks should be placed on all of the drinking fountains.
- 2nd. Chain trips should be placed on all automatic flushing devices.
- 3rd. Leaky faucets should be immediately repaired.
- 4th. All exposed pipes should be covered so as to do away with the necessity of leaving valves open to prevent freezing.

Briefly summarized, it will appear that the shortage of water at the Ohio State Sanatorium is due to two widely different causes: first, a very material decrease in the yield of the springs; and second, to a gross waste of water at the institution and to heavy losses due presumably to leaky conditions of either or both the distributing mains or the standpipe. The problem of making the water supply of the institution adequate should be attacked from both ends, that is to say, the maximum amount of water possible should be made available to meet any possible emergency on the one hand and on the other hand gross wastes and leakages should be curtailed for economic considerations. Therefore, it will be advisable

- 1st. To construct the drain from the spring basin to the pump well as outlined in this report;
- 2nd. To make the changes in plumbing fixtures as suggested; and,
- 3rd. To conduct a rigid investigation to determine the cause of the gross wastes which were not located at the time of this visit.

SEWAGE DISPOSAL AT THE OHIO STATE SANATORIUM, NEAR MT. VERNON, OHIO.

In 1909 there was built near Mt. Vernon, Ohio, a State tuberculosis hospital, known as The Ohio State Sanatorium. This hospital is capable of accomodating about 200 patients and 50 employes. It is not likely that the total population will at any time exceed 300 within the next ten years. The institution produces, of course, large quantities of sewage and

because of its strongly infectious character special precautions must be taken to insure the final disposition of the sewage in a safe manner. The only water course available in this instance for receiving the sewage is a small one which rises in a number of springs on the grounds of the institution. The normal flow is from 200,000 to 300,000 gallons per day, but since one of the springs serves as a water supply for the institution about 30,000 gallons per day will be withheld from the stream. During dry weather in the summer months the stream may have practically no flow.

The situation is further complicated by the fact that the stream, after passing the institution grounds, is used for cattle watering. It was necessary, therefore, to effect a high degree of removal and mineralization of organic matter, and sterilization of the effluent also was considered advisable. Because of the small size of the institution and the impracticability of the employing of a man to devote all of his time to its care, simplicity of construction and operation was considered essential. As a basis for the design there was assumed a population of 300 and a sewage flow of 80 gallons per capita per day, or a total of 24,000 gallons daily. These assumptions are both liberal.

Sewage is conveyed to the purification works, which are located on the institution grounds, through two long inverted siphons, 6 inches and 4 inches in diameter, respectively. The essential features of the purification works are a screen chamber, two sedimentation tanks, a dosing chamber, four intermittent sand filters, a sludge bed, devices for applying hypochlorite as a disinfectant and a chemical reaction chamber.

Screen Chamber. The screen chamber involves no novel features. It is a concrete tank 7 feet 6 inches long, 2 feet 6 inches wide and 2 feet 6 inches deep inside dimensions. Two sets of grooves in the concrete support screens of $\frac{3}{8}$ x 1-inch iron bars inclined at an angle of 60 degrees with the horizontal. The clear open spaces in the first screen are $\frac{1}{2}$ inch and in the second $\frac{3}{8}$ inch. It will thus appear that the screening is unusually thorough. The refuse caught on the screens amounts to about two pails full per day and is finally disposed of by burying.

Sedimentation Tanks. There are two sedimentation tanks and a dosing chamber combined in a single concrete structure. Each tank is 18 feet long and 9 feet wide inside dimensions. The depth to the flow line may be varied from $4\frac{1}{2}$ to 6 feet by means of adjustable brass weirs at the outlet end of each tank into the dosing chamber. Two 5-inch Miller automatic siphons furnish a fluctuating head for the operation of the tanks. The capacity of the tanks may be varied from 10,900 to 14,600 gallons, representing periods of flow of 10.9 and 14.5 hours respectively. The sedimentation period can be further reduced by using a single tank, and this will ordinarily be done, using an adjustment at the weirs to attain a 6 to 8 hour flow. The capacity of the dosing

chamber may be varied from 1,450 to 6,130 gallons, representing flow periods of 1.45 and 6.13 hours, respectively. Expressed in another way, these capacities represent a depth of dose on the filters of 13/16 inch and 3 7/16 inches. In practice a dose of 2½ to 3 inches in depth will be used, necessitating the use of a portion of a sedimentation tank as a part of the dosing chamber. Each siphon supplies a pair of beds, and the flow may be directed on to either or both by suitably placed gates.

Sludge Bed. Owing to the small head available, the sludge bed was made rather shallow. The depth of sand is 1.5 feet and of the underlying gravel 6 inches. The bed is 22 feet by 32 feet in plan and has an area of 704 square feet, which when receiving the contents on the sedimentation tank below the sill of the outlet weir will be covered to a depth of 12.4 inches.

Intermittent Sand Filters. The four sand filters are each 49 feet 9 inches by 60 feet in plan and have a combined net area of 0.265 acres. Based upon a nominal capacity of the plant, there would be population tributary of 1,130 per acre and there would be a rate of treatment of 91,600 gallons per acre per day. These rates are conservative for an institutional plant and should produce an effluent in every way satisfactory as regards its physical characteristics. The filtering material consists of screened sand obtained from a local stream bed. The mechanical analysis shows an effective size of 0.28 mm. and a uniformity coefficient of 2.6. The depth of the sand layer is 2 feet 9 inches, somewhat less than the best practice would require, and under this is a layer of gravel ranging in size from 3 to ¼ inch. The bottom of the bed is arranged in a series of ridges and valleys. At the ridges the gravel layer is 3 inches thick and at the valleys, 9 inches thick. In the valleys are laid vitrified pipe collectors laid with open joints.

The appearance of the filters is added to very greatly and that at comparatively small expense, by surrounding the filters with concrete walls 8 inches in thickness. Concrete walls also have a practical value in that they do away with the danger of soil being washed on to and clogging the surface of the filters, and furthermore the laborious maintenance of sodded sloping embankments is obviated.

A novel feature of the filters is the method of distributing the sewage on the surface of the beds. The discharge from the dosing chamber is conducted through cast iron pipes embedded in the sand bed at a depth below the surface of 2 feet to vertical risers terminating at the sand level at the center of each bed. Around the riser opening is a circular concrete slab 6 feet in diameter surrounded by large cobbles to break the force of the flow. This method of distribution adds very much to the appearance of the filters, facilitates raking and scraping of the sand filters and otherwise gives satisfactory results.

Sterilizing Plant. The effluent from the four filters is conducted to a sterilizing plant housed in a brick building at the center of the group of filters. The solution is mixed in two wooden tanks 4 feet in diameter and 8 feet in height with a wooden dissolving box at the top of each. These boxes have a number of side openings at different levels fitted with plugs so that the clear solution may be decanted and all solid particles prevented from entering the tank proper. The solution passes to a regulating box whose inlet opening is controlled by a float valve in order to secure a constant level of the liquid. The outlet consists of an adjustable brass orifice placed in one end of the box and readily visible and accessible. The chemical solution is guided by a suitable spout into a circular mixing pool in the center of the building where all the effluent channels join. The treated water passes through a so-called reaction chamber, a covered concrete tank below the surface of the ground, 30 feet long 4 feet wide and 3 feet deep to the flow line, thus giving a capacity of 2,700 gallons, or 2.7-hour flow, based upon the nominal capacity of the plant. The average quantity of disinfectant will be about 6 parts per million gallons based upon 33 per cent available chlorine.

Instructions for Operation. Instructions for operating the plant were sent to the superintendent of the institution, which have served as a basis for the operation of the plant by the caretaker. These instructions lay stress on maintaining a general tidiness about the works, and deal with such subjects as the cleaning of the screens and sedimentation tanks and the operation of filters and sterilizing plants. After suggesting that the sand surfaces of the filter beds be raked to a depth of about 1 inch if sewage shows a tendency to pond upon them, the instructions go into details of operating the disinfectant plant. To accomplish this disinfection about $3\frac{1}{2}$ pounds of hypochlorite are required per day. The attendant in charge of the purification works is required to maintain daily records of the operation of the plant on blanks provided by the State Board of Health.

Tests Made by the State Board of Health. One of the assistant engineers made two tests of this sewage disposal plant. The first test was made on October 19th and 20th, 1910, and the second on November 30th and December 1st, 1910. A part of the results of the first test were lost by an accident to some of the samples during shipment and, therefore, only partial results are shown for this test. The following report was subsequently submitted:

The amount of sewage reaching the plant at the time of each test was approximately 40,000 gallons per day. The number of people in the institution during each test was about 95. It will be noted that if the capacity of the plant is based on the amount of sewage reaching it, the plant during both tests was being worked at a greater rate than that for which it was designed, whereas if the capacity of the plant is based on

the number of persons tributary thereto, it will be seen that the plant was being operated at but 35 per cent of its nominal capacity.

The 40,000 gallons of sewage noted at the time of both tests is equivalent to a rate of filtration of 151,000 gallons per acre per day, and the number of persons served by the plant is equivalent to 375 persons per acre. As only two beds were in service at the time of each test, the net rate of filtration is double that shown, or 302,000 gallons per acre per day, and the number of persons tributary corresponds to 750 per acre. The usual great variation in the volume of sewage, typical of institutional plants was not noted at this plant. The flow was very nearly constant during the entire 24 hours, showing that there is a great deal of carelessness observed in the use of water at the sanatorium. The sewage at all times is very dilute. Its weak character is especially noticeable in the early morning at which time the sewage is almost free from turbidity and suspended matter. The sewage at all times contains dissolved oxygen, averaging during the day 1.1 parts per million. A sample taken in the early morning contained 2.7 parts per million.

During both tests only one sedimentation tank was in service. All of the stop plates at the outlet of the tank were withdrawn so that the flow line was maintained at a level of $4\frac{1}{2}$ feet above the bottom of the tank. The storage capacity thus afforded was 5,450 gallons which is equivalent to an average period of flow of 3.27 hours.

The small capacity of the dosing chamber causes the period between discharges of the siphons to be very short, averaging for the 24 hours 0.85 hours. With this short interval between doses each filter unit received a dose $\frac{3}{4}$ -inch deep over its entire area on an average every 1 hour and 40 minutes.

During the first test the northeast and southwest filters were in service; these filters had been raked five days previously and had been in service since. The sewage disappeared from the surface of the filters in about 30 minutes after the dose was applied. During the second test the northwest and southeast filters were in service when the first set of samples was collected; these filters were considerably clogged and sewage remained on the surface for the entire period between doses. This condition is reported to have prevailed for 24 hours. After collecting the first set of samples the northeast and southwest filters were thrown into service. The filters had just been raked and were in excellent condition. The sewage disappeared from the surface of these filters in about 15 minutes.

The disinfectant solution was mixed substantially according to directions. Three pounds of calcium hypochlorite were used daily being mixed in two batches of $1\frac{1}{2}$ pounds each in about 600 gallons of water. The solution was discharged into the effluent drain from the filters at a constant rate throughout the 24 hours. Assuming the hypochlorite to have 34 per cent of available chlorine this amount corresponds to 2.9

parts per million of chlorine in the filter effluent. The period of retention of the treated effluent in the reaction chamber averages 1.65 hours for the 24 hours.

From the accompanying table of analyses it will appear that the sewage is a comparatively weak one. The effluent of the sand filters shows good nitrification and its physical appearance is satisfactory. The bacterial content of the effluent before treatment with hypochlorite shows a high degree of purification, but its dangerous character is evidenced by the presence of intestinal bacteria in such small quantities as 0.1 c. c. A glance at the bacterial analyses of the effluent after disinfecting will show that the process is entirely satisfactory for all practical purposes.

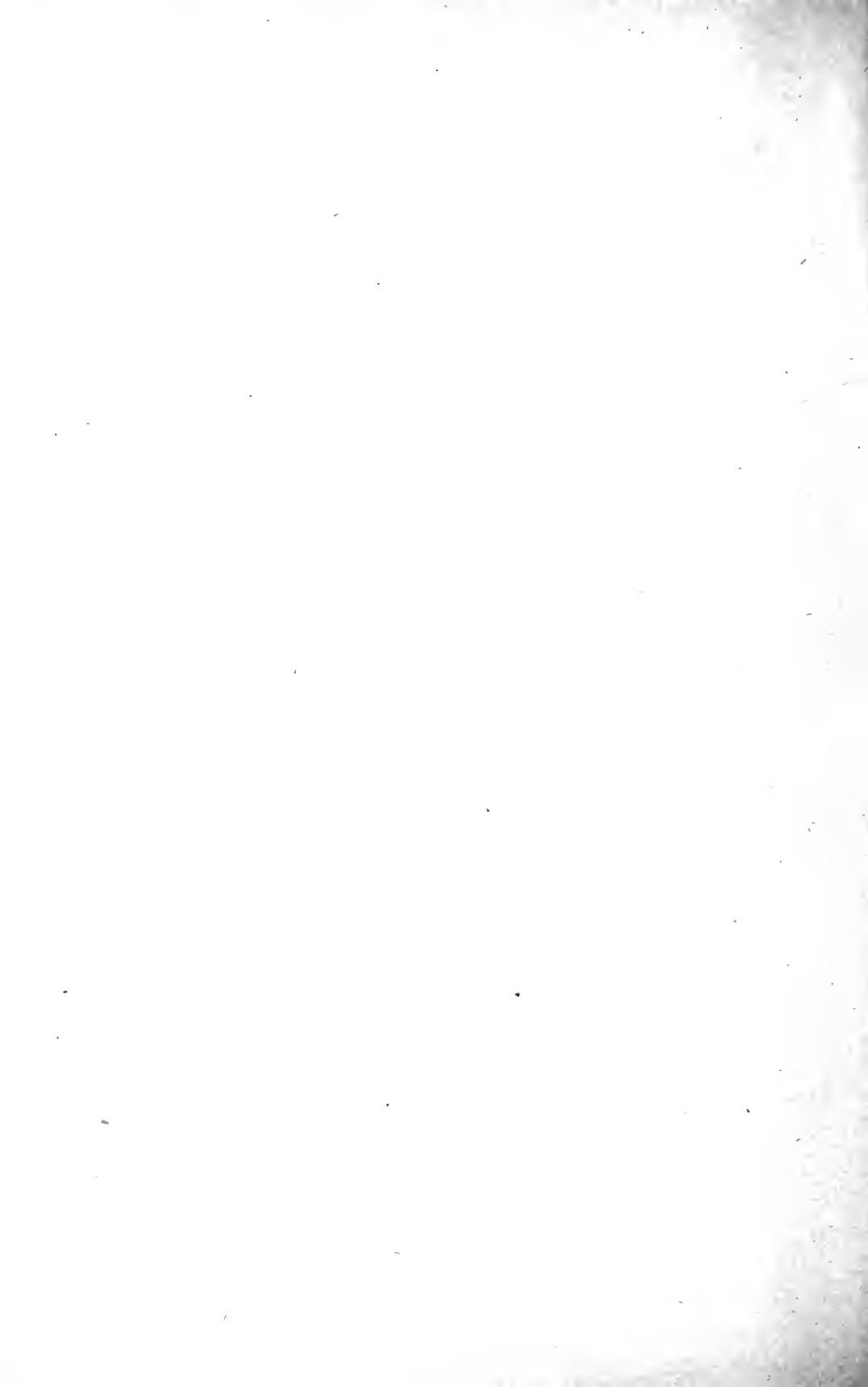
RESULTS OF PHYSICAL AND CHEMICAL EXAMINATION OF CRUDE SEWAGE AND FILTER EFFLUENTS.

Date.	Oct. 19-20, 1910.		Dec. 1, 1910.	
	Sew- Crude age.	Efflu- Filter ent.	Sew- Crude age.	Efflu- Filter ent.
Turbidity	80	none	120	none
Sediment	dist.	none	decided	none
Color			23	2
Odor	sew.	none	fresh. sew.	none
Oxygen consumed	23.	2.60	36.0	1.1
Kjeldahl nitrogen	23.5	3.4	17.5	2.0
Free ammonia	9.	0.14	6.0	0.22
Nitrites .....	.014	0	.016	.016
Nitrates	0.0	1.0	0.0	11.6
Chlorine	25.	65.	10.	10.5
Alkalinity	114.	188.	156.	148.
Total solids	318.	335.	442.	258.
Fixed	245.	302.	244.	224.
Volatile	73.	33.	198.	34.
Dissolved oxygen			1.1	.....

RESULTS OF BACTERIOLOGICAL EXAMINATION OF FILTER EFFLUENT BEFORE AND AFTER DISINFECTION.

Date	Time	Source.	Bact. per cc.	Colon.	
				Pres. in	Abs. in.
1910					
Oct. 19.....	2:00 P. M.....	Eff. S. W. filter....	4,200	1.0 cc.	0.1 cc.
Oct. 19.....	5:00 P. M.....	Eff. S. W. filter....	9,000	1.0 cc.	0.1 cc.
Oct. 20.....	6:30 A. M.....	Eff. S. W. filter....	50,000±	.....	1.0
Oct. 19.....	3:30 P. M.....	Eff. N. E. filter....	7,400	0.1	.....
Oct. 19.....	7:30 P. M.....	Eff. N. E. filter....	50,000±	1.0	0.1
Oct. 20.....	8:30 A. M.....	Eff. N. E. filter....	8,300	1.0	0.1
Oct. 19.....	2:00 P. M.....	Disinfected effluent.	19	.....	1.0*
Oct. 19.....	3:30 P. M.....	Disinfected effluent.	18	.....	1.0*
Oct. 19.....	5:00 P. M.....	Disinfected effluent.	40	.....	1.0*
Oct. 19.....	7:30 P. M.....	Disinfected effluent.	300	.....	1.0*
Oct. 20.....	6:30 A. M.....	Disinfected effluent.	140	.....	1.0*
Oct. 20.....	8:30 A. M.....	Disinfected effluent.	180	.....	1.0*
Dec. 1.....	8:00 A. M.....	Eff. N. W. filter....	17,000	0.1	.....
Dec. 1.....	9:00 A. M.....	Eff. S. E. filter....	22,000	0.1	.....
Dec. 1.....	11:00 A. M.....	Eff. N. E. filter....	50,000±	0.1	.....
Dec. 1.....	11:00 A. M.....	Eff. S. W. filter....	29,000	0.1	.....
Dec. 1.....	2:00 P. M.....	Eff. N. E. filter....	21,000	0.1	.....
Dec. 1.....	2:00 P. M.....	Eff. S. W. filter....	12,000	0.1	.....
Dec. 1.....	6:30 A. M.....	Disinfected effluent.	47	.....	50.
Dec. 1.....	8:00 A. M.....	Disinfected effluent.	500±	50.	1.0
Dec. 1.....	9:00 A. M.....	Disinfected effluent.	350	.....	50.
Dec. 1.....	11:00 A. M.....	Disinfected effluent.	9	.....	50.
Dec. 1.....	2:00 P. M.....	Disinfected effluent.	92	.....	50.

*50 cc. samples lost in transportation.



REPORT OF EPIDEMIOLOGIST

(427)

REPORT OF THE EPIDEMIOLOGIST

An epidemiologist was appointed by the State Board of Health at their meeting held on June 1st, 1911. The appointee began work on July 1st, 1911. It was specified by a committee of the State Board of Health that the work of the epidemiologist should consist of field investigations and the clerical work incident to this and that the remainder of his time should be spent in the Hygienic Laboratories. The work of the Hygienic Laboratories is covered by another report. The report of the various field investigations made follows.

GENERAL STATEMENT.

It has been difficult to secure exact data as to the prevalence of the various contagious diseases in Ohio during 1911. The returns from the various health offices, their annual reports, newspaper items, and number of specimens submitted to the laboratories are the foundation for the following inferences:

Diphtheria.

Diphtheria has been moderately prevalent during the late summer and autumn months of 1911. The number and character of swabs submitted to the laboratories is evidence that these have been used not only as an aid to diagnosis, but also for the release of cases and control of epidemics. Laboratory diagnoses and advisory correspondence have to a large extent supplemented personal investigation except in extreme cases.

Scarlet Fever.

Scarlet fever has been moderately prevalent during the autumn and winter months of 1911. Possessing no laboratory method of diagnosis, mild and atypical cases have escaped quarantine and have been a fruitful source of exposure. This, together with non-report of cases, failure to quarantine exposures to recognized cases with a too short period of quarantine in nearly every instance, has been the cause of the extreme prevalence. The disease has as a rule been mild in type, but this was by no means invariably the case.

Typhoid Fever.

Typhoid fever has been sporadically prevalent and serious epidemics have occurred in Newark, Willoughby, New Athens, Stafford and the larger cities. Milk has been a fruitful source of infection, notably in Newark and Willoughby. Taken as a whole, endemic typhoid is a more

serious problem than typhoid fever in the epidemic form, for there are many more cases than occur in epidemics and it calls for more rigorous investigation and a much greater improvement of sanitary conditions.

Smallpox.

Smallpox continues to be prevalent in mild form. A table showing cases and deaths follows:

CASES AND DEATHS FROM SMALLPOX REPORTED TO THE STATE
BOARD OF HEALTH FROM JANUARY 1ST
TO DECEMBER 31ST, 1911.

County.	Place.	Cases.	Deaths.
Adams	Liberty Township.....	27	.....
Allen	Lima	5	.....
Ashland	Ashland	3	.....
Ashtabula	Conneaut	3	.....
Brown	Clark Township.....	4	.....
Butler	Middletown	15	.....
	Milford Township.....	1	.....
Clark	Springfield	81	1
	Springfield Township.....	4	.....
Clermont	Bethel	3	.....
Crawford	Bucyrus	1	.....
Cuyahoga	Cleveland	5	.....
Darke	Wabash Township.....	4	.....
	York Township.....	1	.....
	Adams Township.....	4	.....
Defiance	Defiance	90	.....
	Defiance Township.....	3	.....
	Ney	1	.....
	Noble Township.....	10	.....
	Tiffin Township	9	.....
Delaware	Delaware	2	.....
Franklin	Columbus	21	.....
	Westerville	30	.....
Fulton	German Township.....	4	.....
Geauga	Burton	2	.....
Hamilton	Cincinnati	93	.....
Hardin	Alger	3	.....
Hocking	Murray City	1	.....
Lawrence	Ironton	1	.....
Licking	Johnstown	1	.....
	Newark	2	.....
Lorain	Lorain	7	.....
Lucas	Jerusalem Township.....	1	.....
	Toledo	13	.....
Marion	Marion	56	.....
	Marion Township.....	2	.....
	Pleasant Township.....	4	.....
	Prospect	5	.....
Miami	Troy	1	.....
Monroe	Switzerland Township.....	1	.....
Montgomery	Dayton	2	.....
Morgan	McConnelsville	9	.....
Ottawa	Benton Township.....	9	.....
Perry	New Lexington.....	12	.....

CASES AND DEATHS FROM SMALLPOX—Concluded.

County.	Place.	Cases.	Deaths.
Pickaway	Circleville	1	.....
	Darby Township.....	4	.....
Portage	Ravenna	1	.....
Ross	Concord Township.....	1	.....
	Frankfort	9	.....
Sandusky	Gibsonburg	1	.....
Scioto	Clay Township.....	1	.....
	Valley Township.....	4	.....
Williams	Montpelier	3	.....
	Stryker	1	.....
Wood	Cygnets	3	.....
Counties 37	Places, 55—Total.....	590	1

Infantile Paralysis.

Acute anterior poliomyelitis has been moderately prevalent, although reports of sporadic cases are few. Both Cincinnati and Cleveland have suffered from epidemics of this fatal disease. In Cincinnati the outbreak was investigated by Dr. W. H. Frost of the United States Public Health and Marine Hospital Service, and the epidemiologist went over the ground carefully with Dr. Frost.

SPECIAL REPORTS.

DIPHTHERIA AT THE TUSCARAWAS COUNTY CHILDREN'S HOME, CANAL DOVER.

On July 23rd, 1911, in compliance with the request of Dr. Douthitt, physician to the Tuscarawas County Children's Home, the epidemiologist visited that institution for the purpose of investigating the continued prevalence of diphtheria and to suggest measures for its restriction. The report follows:

The Tuscarawas County Children's Home is situated just within the limits of Canal Dover, adjoining those of New Philadelphia. The main building was formerly a residence and is surrounded by farm lands, forty acres of which belong to the institution and are used to raise much of the food consumed by the children. The bakery is a separate building, and the upper story is used as a gymnasium. The other buildings consist of barns and stables.

During the winter and spring preceding April, 1911, there had been very little sickness in the Home and no cases of diphtheria. On April 15th, however, two of the children took sick and the physician pro-

nounced their disease diphtheria, confirming his diagnosis by means of a swab submitted to the Hygienic Laboratories. Since that time there have been 23 cases and one death.

<i>Month.</i>	<i>No. of Cases.</i>	<i>No. of Deaths.</i>
April	4	1
May	4	0
June	9	0
July	6	0
	<hr/>	<hr/>
Total	23	1

A mortality of 4.34%.

All of the patients were children under ten years of age. There have been intervals of freedom from diphtheria not amounting to over three weeks at any one time.

Possible Sources of Infection. (1) The mother of the first two children who contracted diphtheria was a factory employe in New Philadelphia, where diphtheria was moderately prevalent. She was employed as a nurse for the children at the isolation room at the time of the investigation. There was no history of sore throat. Bacteriological examination proved that she was a carrier of the diphtheria bacillus, but as she had been in the sick room for some time when this examination was made, she may have become infected from the patients in her care.

(2) Visitors from New Philadelphia and other communities where diphtheria was prevalent had been at the Home previous to the outbreak, but as no account was kept of these visits it was not possible to investigate all of them.

(3) A boy who had diphtheria in the month of February, 1911, was admitted to the Home a month previous to the outbreak. Bacteriological examination showed no diphtheria bacilli in his throat or nose, nor did he have any symptoms of catarrh of the mucous membranes.

Conditions at the Home on July 23rd, 1911. There were three children confined to the sick room, one of these showing all the clinical symptoms and signs of true diphtheria,—a moderate degree of temperature, muscular weakness, and characteristic false membranes over the tonsils and uvula. The other two children were evidently convalescing, having reddened fauces, and bacteriological examination showed that diphtheria bacilli were still present.

(1) The isolation was carried on in an upper room leading from the nursery, with a private bath room attached. All of the supplies and dishes had to be carried through the nursery and from the general dining room to the sick room. The superintendent and matron visited the patients every day, afterward mingling with the healthy children. The nurse in charge did not leave the sick room at any time, but was

unable to carry out the physician's orders intelligently and was herself a carrier, as was proven on two occasions by microscopical examination of her throat excretions.

On several occasions convalescing patients threw toys and other articles through the unscreened windows to children playing below.

(2) With the exception of three rooms, the entire Home had been fumigated by means of a formaldehyde generator. The dining room and two school rooms, all of which were common meeting places for all the children, had not been disinfected.

(3) All of the children at the Home were immunized by means of 1000-unit doses of diphtheria antitoxin at the beginning of May.

(4) Each child was examined in the morning by the superintendent and any child who showed symptoms of diphtheria or sore throat was isolated and later examined by the attending physician.

(5) When clinical symptoms had disappeared the patient was discharged and allowed to mingle with healthy children in the Home. No bacteriological examinations were made.

(6) There was no systematic effort to isolate those who had been exposed to diphtheria patients before a diagnosis had been made.

Improvements Suggested and Made on the Ground. (1) That only the physician be allowed to enter and leave the sick room, and that screens be placed on the windows of the room so that no communication could take place between those who were sick and those who were well.

(2) That at least two negative bacteriological reports from examinations of the throat secretions be received before dismissing a case in which the clinical symptoms have disappeared. This was done and resulted in continued isolation of two cases which had been declared ready for dismissal.

(3) That all "contacts" with children suffering from sore throat, rhinitis or otitis be quarantined and examined bacteriologically before they be allowed to mingle with the other children.

(4) That the school and dining rooms be disinfected.

(5) That the isolation department be moved from its present position or the children be removed from the nursery. As there was no other possible place for the isolation room and as the Home was somewhat crowded, neither of these suggestions was acted upon.

(6) That the dishes and all articles be sterilized before being taken out of the sick room.

Milk Supply. This came from two sources, most of it from the cows belonging to the Home. The cows here were healthy and none of the milkers or those who handled the milk in any way had had diphtheria or showed any signs of sore throat. The rest of the milk was supplied by a farmer who also supplied a large number of customers

scattered through Canal Dover and New Philadelphia. It was learned that there were no more cases of diphtheria on his route, and an inspection of his premises and milkers revealed nothing that would lead to the suspicion that milk was a source or a carrier of the infection. The only manner in which milk could have been responsible for the infection of any of the patients was in its handling at the Home; but even here great care was exercised.

Bacteriological Examinations. Smears were made on the ground from all children who had suffered from diphtheria and which might be possible carriers. When a smear proved suspicious a culture was made and sent to the hygienic laboratories at Columbus. In addition, all children who were suffering from sore throats, rhinitis, or who had an ear discharge, were examined bacteriologically. The servants and those who had come in contact with cases of diphtheria were also examined, as were the "contacts" from the cases which developed on July 30th. These examinations resulted as above mentioned, in the delay of dismissal from quarantine of several children and in finding bacilli in the secretions from the throat of the nurse in charge of the sick room.

CONCLUSIONS.

Because of the fact that some time has elapsed since the beginning of the outbreak, it is not possible to say exactly what is the source of the disease at the Home. The crowded condition of the institution renders the present method of isolation inefficient. The proximity of the sick room to the nursery is a source of danger to the younger children. The failure to stamp out diphtheria seems to be due to (1) lack of efficient isolation; (2) dismissal of patients before their throats are free from diphtheria bacilli; and (3) failure to quarantine "contacts."

RECOMMENDATIONS.

In view of these conditions, the following suggestions were made:

(1) That a temporary isolation hospital be constructed at some distance from the main building and having at least two separate rooms, one for the sick and one for those who have either come in contact with cases or have sore throats. Tents have proven useful and inexpensive elsewhere under similar conditions.

(2) That no children be dismissed from the isolation room until at least two cultures taken from their throats on separate occasions at least two days apart be declared negative.

(3) That all children who have come in contact with those who have diphtheria be quarantined in a separate room or in tents until they are declared free from diphtheria bacilli by means of bacteriological examinations.

(4) That all utensils from the sick room be destroyed or properly disinfected after the last dismissal, and that such utensils while in use be kept free from use by the healthy children.

Since there is a new home being built in Zanesville, it is the intention of the superintendent of the Home at Canal Dover to send about fifty children to that place in a short time. This step might be the means of spreading the disease and should be postponed until the Tuscarawas Home is free from diphtheria.

NOTE — The physician in charge stated later that as soon as these recommendations were acted upon, and those exposed under the old conditions had contracted the disease or escaped, no further cases developed and the disease was soon under control.

TYPHOID FEVER ENDEMIC AT PORTAGE.

At the request of the health officer, the epidemiologist visited Portage on August 23rd, 1911, to investigate the causes of the prevalence of typhoid fever. The report follows:

The village of Portage is situated on a low lying plain once called "the black swamp," because of its lack of elevation and the abundant black surface waters that covered it. The population in 1910 was 560. Steam and electric railways traverse it and connect it intimately with Toledo and Bowling Green, the latter city being three miles distant.

History of Typhoid Fever. Up to the autumn of 1909 very few cases of typhoid fever had been reported in Portage, never more than two at the same time and generally not more than that number during the entire year; but in August, 1909, there came to the village a family of gypsies who encamped at the north end, and the local physician who was called learned that one of the company was suffering from typhoid fever. Two other cases developed shortly afterward in the same camp and the disease lingered among the company until the end of December. At first the family lived in tents and although the physician's orders were stringent, it was thought that excreta from the sick were thrown on the ground, as the family paid little attention to sanitary matters. No more cases of typhoid fever developed in Portage until the spring of 1910, when eight cases were discovered in the north end of the village and several others developed in other parts and continued to spring up during the summer and autumn, so that the records at the health office showed 21 out of a population of 546 had had typhoid fever, and that it was responsible for one death during 1910. The eight cases grouped at the north end were by far the largest number confined to a neighborhood. In nearly every instance the first case in a family led to a secondary case shortly afterward. This year there have been two cases, one of which died, and two more cases are at present convalescing, while

there are several who appear to have the initial symptoms, but no absolute diagnosis has as yet been made. The present cases are scattered and are not confined to any one neighborhood.

Clinical. The following details were secured through the kindness of Dr. Fisher:

Case No. 1. This patient was seen August 23rd. Mr. B. gave a somewhat indefinite history of weakness and lassitude for about ten days before he took to bed. He was a barber and just before he noticed these symptoms coming on he had shaved a young man who died of typhoid fever ten days later. Since the onset of his symptoms he has had a remittent temperature. There was a crop of roseola on his abdomen and his spleen was palpably enlarged. There was also some tenderness in the abdominal region but no tympany. His tongue was clean. This was the third week of his illness.

Case No. 2. Mrs. S. gave a very definite history of epistaxis, anorexia, weakness and lassitude some two weeks before she was forced to take to bed. On August 23rd her facial aspect, coated tongue (clean on the sides), and pain on pressure in the right iliac region, typical roseola and tympanitis presented a characteristic picture of clinical typhoid fever. Her spleen was definitely palpable. Her temperature had been and still remained of the remittent type, ranging from 100° to 104° F. She had previous to her illness been very careful about drinking no water but that drawn from a neighbor's well, which will presently be described, and had not come in contact with any other cases of typhoid fever. She had also been extremely careful regarding flies and there were very few in the house.

Prophylaxis. The doctor's orders were in both these cases that every article of clothing that was worn or had come in contact in any way with the patient was to be thoroughly disinfected by means of a 5 per cent. solution of carbolic acid. The excreta were to be received in the same solution. Every one who cared for the patient in any way was required to wash his or her hands in a 5 per cent. carbolic solution before leaving the room. The dishes used by the patient were sterilized before being used by other members of the family.

Water Supply.

Wells. The village is supplied with drinking water by means of dug and drilled wells. There are four wells largely used by the public and in addition a number of private wells. These are all about the same depth, from 120 to 135 feet. A number that are deeper than these have pierced to the "sulphur water" and are not very palatable. All of these wells pierce a solid limestone stratum which rises to the surface about one-half mile from the northern extremity of the village and slopes from there until at the southern extremity it has reached a depth of from 7 to 9 feet below the surface.

One-half mile from the village and to the north there is an old limestone quarry which is filled with surface water, and owing to the dead animals contained therein it is very offensive. It has been thought that this might contaminate the wells of the village.

*Winton's Well.** This well is situated at the northern extremity of the village and is the principal source of water supply for that neighborhood. It is a drilled well 133 feet in depth and has little casing. The ground leading to it is slightly elevated and it is furnished with an excellent concrete cover. One hundred and twenty-five feet to the east there is a common trench privy, where no disinfection is practiced. This well *evidently* does not become polluted during wet weather.

*Stratton's Well.** This is situated on Findlay Street to the south. It was a dug well until about two years ago, when it was drilled and encased and a catch basin was put in. The depth is about 130 feet. The casing is not cemented and during rainy weather the water becomes turbid. About 125 feet to the east there is a common trench privy which is seldom if ever cleaned. Distant about 20 feet is a storm sewer, laid on Findlay Street in 1906 and approved by the State Board of Health.

Street Wells. There are two street wells, one on Findlay Street just opposite the Winton well, and another on the corner of Findlay and Main streets. The former contains sulphur water and is little used. The latter was deepened a short time ago and the drill penetrated to the sulphur water. This well is largely used at the present time. Distant 125 feet is an insanitary trench privy.

School House Well. This is situated at the extreme east end of the village on Main Street. It is a drilled well, thoroughly encased and covered. There have been no cases of typhoid fever among those using this well.

Private Wells. There are a number of these and they all have the same general characteristics. They are drilled or dug, are not farther than the length of a lot (125 feet) from a privy, and many are easily contaminated by surface water. Some of them contain sulphur water, which is very unpalatable.

Food and Flies.

Milk. Not one case of typhoid fever could even be indirectly traced to the milk supply. A dairyman who supplied only one customer had three cases of typhoid fever in his family late last December. This spring his customer died of typhoid fever. The milk man who supplies most of the people who do not keep cows has not had one case of typhoid

*The analyses of water from Winton's and Stratton's wells appear on subsequent pages. The results in both cases point to surface contamination and the fact that they had been subject to considerable pollution in the past. It was recommended that water from both these wells be boiled before using.

fever in his family, and very few of last year's cases took his milk, while a large number outside of his route were ill. There is an abundance of flies and as it is suspected that in some of the cases the doctor's orders were disobeyed and the excreta thrown upon the ground, there is reason to suppose that there has been some food infection.

Personal Infection. There was laxity in carrying out the doctor's orders as to personal disinfection and disinfection of linen and vessels. No isolation was practiced and visitors were admitted at all times.

Summary.

From the characteristics of the soil and the general insanitary condition of the privies and wells, it is evident that the principal cause of the high morbidity of typhoid fever in Portage is soil pollution, with the consequent periodic pollution of the drinking water. The fact that there were so many secondary cases indicates that contact infection played a large part in the spread of typhoid fever. Food and flies may have been responsible for some cases in the past.

RECOMMENDATIONS.

On account of the laxity in the carrying out of individual prophylaxis, the following rules were recommended:

(1) The sick room should be large, easily ventilated, and as far as possible from the sleeping and living rooms of other members of the family. There should be a free circulation of air through the room day and night. The bed should be placed in the center of the room and should be protected by a rubber sheet over the mattress.

(2) One attendant should take entire charge of the patient and no one besides the physician should be allowed to enter the room.

(3) Flies should be rigidly excluded from the sick room.

(4) All eating and drinking vessels used by the patient should be kept for his use alone, washing them in the sick room in hot soap suds and then rinsing in boiling water.

(5) The clothing of the attendant and patient with all the linen or other clothes which have come in contact with the patient, attendant, or the patient's discharges, should first be soaked in a solution made by adding one pint (or pound) of either the crude or the purified liquid carbolic acid to $2\frac{1}{2}$ gallons of hot water, for one hour. These should then be boiled in water and soap suds for five minutes.

(6) The discharges from the bowels and kidneys should be received in a bed pan or vessel containing a carbolic acid solution, made as above, and enough of the same added to cover them, in which they should be allowed to stand for not less than an hour, when they may be emptied into a privy and covered with powdered slaked lime.

(7) The hands of the attendant should be washed after waiting on the patient each time and rinsed in the carbolic acid solution, and this should also be done before each meal.

To prevent the pollution of the soil and the consequent pollution of the unprotected wells, the following rules were recommended for the construction of privies:*

(1) All privies should be provided with watertight receptacles resting at or above the surface of the ground and so placed that all fecal matter is discharged into them.

(2) The receptacles in which fecal matter is contained should be entirely enclosed in a suitable compartment under the seats which will prevent the admission of flies. It should be so constructed as to be readily accessible for inspection and the removal of receptacles.

(3) All seats should be provided with hinged covers which will not remain open unless held open.

(4) An ample supply of powdered slaked lime or pulverized earth should be accessible for sprinkling over the fecal matter after each use of the privy.

(5) As soon as full the receptacles should be emptied and the material removed at least one-fourth of a mile beyond the village limits and buried in the ground.

(6) It should be the duty of the health officer or his representative to inspect all privies not less frequently than once in two months, and to prosecute persons found not complying with the above rules.

TYPHOID FEVER EPIDEMIC AT NEWARK.

In compliance with the request of Dr. W. H. Knauss, health officer of Newark, the epidemiologist visited that city on September 11th, 1911, and made an investigation into the causes of the epidemic of typhoid fever. The report of the investigation follows:

The city of Newark is the county seat of Licking County and is situated in the central part of the state. There has been a large increase in the size of the city within recent years, the last census showing a population of 25,404. Typhoid fever has been endemic at Newark for some years. Previous to 1909 no trustworthy statistics were kept by the health department. Since that time, however, accurate records have been kept of all cases of contagious and infectious diseases and all details obtainable as to their cause. There were in 1909, 47 cases of typhoid fever, distributed in point of time over the following months:

*It has been found that the recommendations in regard to the care of privies were not acted upon by the health authorities at Portage, and although no further outbreak has occurred, yet all the conditions favor such result, and insanitary wells and privies should certainly be remodeled.

<i>Month.</i>	<i>No. of Cases.</i>
May	1
June	13
July	2
August	7
September	12
October	8
November	4
Total	47

1910.	
<i>Month.</i>	<i>No. of Cases.</i>
March	1
April	1
July	9
August	10
September	5
October	8
November	3
Total	37

In 1911 no cases were reported until May 5th.

<i>Month.</i>	<i>No. of Cases.</i>
May	2
June	1
July	2
August (to 27th)	7
Total	12

From August 27th to October 9th, when the epidemic apparently came to an end, there were reported 55 cases.

From a consideration of the figures above quoted it will be seen that up to August 27th the situation was about the same as in 1909-10. Since that time, however, cases developed at the rate of 1.25 a day for 44 days. Of the cases occurring before the epidemic it was found that there were five families which had two or more secondary cases. These were thought to be due to contact infection.

In order to secure an intelligent grasp of the situation, it was decided to visit each case when necessary and secure the information tabulated on the blanks issued by the State Board of Health. Many details were, however, irrelevant to this particular epidemic and these were omitted.

Sex. Of 16 cases made the subject of inquiry, 11 were males and 5 females.

Age. Of 16 cases

4	or 25	%	were	under	12	years	of	age;
2	"	12.5	%	"	between	12	and	16;
3	"	18.75	%	"	between	17	and	26;
3	"	18.75	%	"	between	27	and	36;
4	"	25	%	"	between	37	and	59.

The extremely large percentage of children is to be noted, as well as the number of cases among those over thirty-seven.

Disinfection. The disinfection in every case visited was well carried out after the diagnosis was made. Before any conclusion had been reached as to the diagnosis, and particularly before there was evidence that an epidemic was present, disinfection was little if at all practiced.

Grouping. The cases were scattered over fifteen streets. The grouping appeared to be irregular, but it was found to almost exactly correspond with the route followed by one of the milk men.

Water. Twenty-one cases were made the subject of a house-to-house investigation and questioned as to the water used by them during the month preceding their illness. From this it appeared that many were skeptical as to the purity of the water supply.

- 7 used well water alone;
- 7 used city and well water;
- 7 used city water alone.

Many of the last two classes also used bottled spring waters of various kinds.

Milk. The milk supplied to the various cases before August 27th, that is, previous to the epidemic, came from various sources. Thus, the twelve cases reported before that date were supplied by seven different dairymen. After August 27th, 44 of the 55 cases reported used milk from the same dairy either alone or along with other supplies during the month preceding their illness. Of the remaining 11 cases some were reported not to have used any milk, but must have used it in various foods. Others were boarders and could not say where the milk came from, and still others (one or two) denied taking milk at any time from the suspected dairy.

Sewerage. It was found that 22 out of 28 houses in which typhoid fever was present had no sewerage connections, but depended entirely upon antiquated and unsanitary privies. In most cases the vaults were not cemented, if indeed they were anything but a simple excavation. Neither were they protected from flies and were seldom if ever cleaned out.

Type. Clinically, the cases were divided somewhat arbitrarily, it is true, into very mild, mild, moderate and severe, depending upon the de-

gree of temperature, length of illness, depth of prostration and complications. Of 21 cases studied one was very mild, 10 were mild, 3 were severe and 7 were moderate. There was one death.

Diagnosis. The diagnosis of typhoid fever was assured by the large number of physicians attending the cases and the fact that Widal reactions were positive in a large number of instances.

Social Condition. The cases occurred mostly among the better classes of people. Few, if any, of the houses were overcrowded, there being an average of 4.5 persons in each residence. Other supposed sources of typhoid were mentioned by various persons, but these were more in the nature of nuisances, such as stagnant streams and pools, etcetera, and it is a well recognized fact at the present time that the etiological agent is the typhoid bacillus, and that this bacillus must gain access to some article of food or drink before it can set up the disease.

From a consideration of the above data, it is evident that typhoid fever was epidemic at Newark from August 27th to September 28th, so the epidemic was, therefore, explosive in character and must have been brought about by a temporary contamination of some common article of food or drink. The temporary infection of milk or water alone would explain it.

Water. Considering the question of the water, it was found that the majority of the cases had not used the public water supply. Many were skeptical of its purity and had depended upon spring or well water. Many different wells were used and no well or spring had been used in common, so water may be eliminated as the cause of the epidemic, that is, as the direct cause. It is probable that water was responsible for endemic typhoid at Newark, since the rise and fall of the river water was followed by a rise and fall of the number of cases reported; and an examination made in the hygienic laboratories proves that the public water supply is not safe, since *B. coli*, the evidence of pollution, were found in samples of tap water submitted quite recently.

Milk. Considering milk as a vehicle of infection, it was found that all or nearly all of the persons affected used milk from the same dairy. Some of them had discontinued using it at the time of investigation, but admitted that it had been used during the period preceding their illness, which corresponds to the period of incubation. Further, of 16 cases studied, it was found that 25 per cent. were under 12 years of age. The dairyman and his wife were also victims of the epidemic, developing symptoms on August 25th and 29th, respectively, so it is evident that they themselves did not infect the milk. The dairyman was supplied by six farmers, and all were made the subject of a careful investigation. On two of the farms there had been cases of sickness within the last month, but a careful laboratory examination of their blood demonstrated that they were not suffering from atypical typhoid fever.

The sanitary arrangements on two farms were poor, but since there had been no cases of typhoid fever at either, among the employes, visitors or families, the supply houses were eliminated as causes of the epidemic.

The premises of the distributing dairy were as sanitary as could be expected. Steam sterilizing apparatus was used to sterilize the bottles and the dairy was separate from the house and connected with a separate vault, rendered watertight by concrete, into which the wastes from the dairy flowed. Tap water was used to rinse the bottles.

When searching for the cause of the milk infection it was discovered that one of the dairyman's customers had taken sick on July 20th with some obscure complaint. He had proceeded to Boston, where his illness became more severe and he was finally taken to a hospital and demonstrated to have typhoid fever by a bacteriological examination. In the house which he had occupied at Newark, another case of typhoid developed on August 17th. This, then, was a possible source of the infection, for the bottles becoming infected at this house might not have been sterilized for a sufficient time or at a sufficiently high temperature to kill all bacilli. It is a well known fact that typhoid bacilli grow very rapidly in milk, especially if it is not kept cool. Eyre calculates, that in fresh milk from a healthy cow the rate of increase in twenty-four hours will be from 1 to 6,000, and in seven days it will have reached the enormous number of 440,000,000. Typhoid bacilli grow in milk without changing its appearance, so that they are not detectable except by laboratory technique; so milk infection constitutes a particularly insidious vehicle for the dissemination of typhoid fever. The argument met with in some quarters that milk epidemics are not common cannot be supported, for in Bulletin No. 56 of the Public Health and Marine Hospital Service of the United States, is found the following statement: "The principal means by which typhoid fever is distributed in places where there is a safe and hygienic water supply is through milk." Of 878 epidemics studied in which the cause was known, 540 were due to water and 338 to milk. In all the milk epidemics studied in this bulletin the percentage of cases among children is high.

Because of the sickness of the dairyman and his wife and the confusion necessarily resulting, it was found impossible to ascertain the exact number of customers or amount of milk distributed; but his drivers were carefully examined and showed that his route corresponded almost exactly with those streets on which the majority of cases of typhoid fever occurred.

The large number of houses not connected with the sewerage system and using wells constitute a menace to the health of the city, for in almost every case the well is so situated that it is easily infected by the privy, and when the latter is used as a depot in which to place the discharges of a patient all the conditions are ripe for a house or neighborhood epidemic.

CONCLUSIONS.

The epidemic of typhoid fever occurring at Newark between August 27th and September 28th was due to the temporary infection of the dairy and milk supplying a majority of the cases. The infection did not come from the employes or family of the dairyman, nor did it originate from the farmers who acted as supply agents. It was probably due to one of the earlier cases mentioned. The possibility of its being due to tap water used to rinse the bottles is remote. The quick action of the local health officer in closing the dairy temporarily probably prevented the development of many more cases. The use of insanitary privies by a comparatively large number of the residents of Newark constitutes a future menace to the health of that city.

RECOMMENDATIONS.

The engineering department of the State Board of Health investigated and reported upon the condition of the public water supply of Newark, so that it is unnecessary here to make any further recommendations in that regard.

It was recommended that such rules and regulations be enacted by the city of Newark as would render the infection of milk impossible; and that these rules and regulations should cover all details in the collection, preparation and distribution of milk.

It was likewise recommended that wherever a sanitary sewer is available, privy vaults be abandoned and connection made direct to the sewer for the purpose of disposing of all domestic wastes. Where it is necessary to use privy vaults these should be constructed in accordance with the provisions of the State Building Code. All abandoned vaults should be thoroughly cleaned, disinfected and filled with clean earth or ashes.

NOTE—The health officer stated in a later communication that both these recommendations were being slowly acted upon. During the remainder of the year there were a few sporadic cases of typhoid fever but no outbreak.

TYPHOID FEVER AT GLENDALE.

On September 17th, 1911, at the request of Dr. J. H. Landis, health officer of Cincinnati, five cases of typhoid fever at Glendale were visited and investigated by the epidemiologist. The report follows:

Glendale is a suburb of Cincinnati and has a population of 1741. At the time of the investigation there were four cases of typhoid fever at Glendale and one death had occurred just previous to this time. It was deemed advisable to visit each family to gather all the important factors having to do with the possible source of infection. A summary of each case follows:

Case No. 1. W. I. S., male, aged 26. First complained on August 15th, and took to bed August 19th. He was attended by Dr. Southworth, who reported the case on September 2nd. Methods of disinfection and disposal of discharges were good, as a trained nurse was in charge of the case. The patient resided on Sherman Avenue and was by occupation a plumber. He had never associated with any one known to have had typhoid fever. There had been three cases of typhoid in the house in previous years,—ten, eight and six years ago, respectively. He used water from a cistern while at home and village and cistern water at his place of business. The milk used at his home came from the Twin Oaks Dairy. He had visited the following places during the month prior to his infection: Reading, Hartwell, Lockland and Cincinnati. Clinically the case was mild. There was a poorly constructed privy close to the cistern.

Case No. 2. J. J. K., male, aged 29. First symptoms on September 4th; took to bed on the 8th. The method of disinfection and disposal of discharges was good. Residence corner of Sherman and Congress avenues and place of business the same. He was a butcher by occupation and had never to his knowledge associated with any one having typhoid fever. He used water drawn from a cistern in the back yard which was by no means sanitary and had a privy which allowed the sewage to seep into and pollute the soil. The milk used at his residence came from the Twin Oaks Dairy. The premises were in a very insanitary condition and were connected with a saloon and store, so that many strangers probably came in and out, as the interurban line passed in front of the house. Clinically the case had been mild, there being no complications.

Case No. 3. C. G., female, aged 23. First complained of feeling sick on September 7th, and took to bed a few days later. The method of disinfection and disposal of discharges was good. Residence on Troy Avenue, and place of business in Cincinnati, where she had worked up to the time she took sick. She did clerical work. She was not known to have associated with any case of typhoid fever. The drinking water at her home was drawn from a cistern and there was a privy without a watertight vault 150 feet distant. The milk used came from Arn's Dairy, and she had never used milk from the Twin Oaks Dairy. The premises were clean. The type of disease was mild, but the temperature had been high.

Case No. 4. H. W. S., male, aged 53. First complained on August 25th, and took to bed on the 29th. Died in two weeks from date of taking to bed. Residence on the corner of Sherman and Congress avenues, and place of business the same. By occupation he was a contractor and builder. It was not known whether or not he had ever associated with a case of typhoid fever. The water used at his home was drawn from a well and a cistern. The well was a dug well, 20 feet deep and poorly protected from surface contamination. The privy did not have a

sanitary vault and was distant 100 feet from the well and 50 feet from the cistern. Milk was obtained from the Twin Oaks Dairy. The patient had been in Cincinnati three weeks before he took sick. Dr. Shepherd attended him. The premises were clean and neat.

Case No. 5. E. W., male, aged 40, milk driver by occupation. Symptoms developed about August 15th, and had been in bed for three weeks. Did not use milk. Disinfection and disposal of discharges not carried out very well. Had been working for the Arn's Dairy and drank water from their well. Visited Weschester about two months before time of illness and Oxford about six weeks previous. Had also been in Cincinnati lately. Clinically the case was moderate in severity. A poorly constructed privy was near the well.

From a review of the data it is evident that there were three patients between the ages of 23 and 28, one 40 and one 53 years of age, so that all were adults. The cases were also well scattered and only one case occurred in each family.

Symptoms of onset developed from August 15th to September 7th, inclusive. There appeared to be no common source of infection, with the possible exception of milk from the Twin Oaks Dairy, which was used in three of five cases. From an epidemiological point of view this dairy can be practically excluded, since it supplied a large proportion of the village and there had been no cases among the children and infants, the greatest milk consumers.

Water came from various sources, although it is possible that all may have used the public water supply. Raw food and vegetables were obtained from different sources in each case, so that they could not have been a common source of infection. It was a little late in the season to draw any conclusions as to the prevalence of the common house fly, but the surroundings in all except one case were insanitary enough to provide ample food for this pest. At the homes of all the cases insanitary privies were used, and all used water from cisterns. That the water from these cisterns was contaminated was proven in Cases Nos. 1 and 5 by a bacteriological examination made at the laboratory of the Cincinnati board of health. Two of the cases lived in homes in connection with saloons, and as the water used was extremely liable to contamination, a case of walking typhoid or a carrier traveling on the interurban lines might have been the means of infecting the water. The proximity of Case No. 4 to Case No. 2 would allow flies to have acted as a medium for transporting the bacilli.

Milk.

Twin Oaks Dairy. The premises of this dairy were inspected. It was found that an employe had typhoid in 1909, and there was suspicion of his being a carrier. For this reason specimens of his feces were examined at the hygienic laboratories. Hesse agar was the medium used

and a large number of dilutions were made. The medium was tested several times to avoid any imperfection in technique. Later this agar was again tested by inoculating feces on which a pure culture of typhoid bacilli had been poured. The results of these tests demonstrated that the driver was not a typhoid carrier and that his feces did not contain *B. typhi*. The premises of the dairy were clean and neat.

Public Water Supply. The public water supply of Glendale is obtained from deep wells and is pumped from these into a standpipe from which it is distributed to the various mains. This supply is not liable to any contamination, has not led to any typhoid fever in the past, and was examined in 1903 by the hygienic laboratories and pronounced safe.

Occupation. The occupations of all the cases were such as would lead to considerable traveling around Glendale and in the vicinity of Cincinnati. In 1911 there was a considerable number of cases in Cincinnati, and it is barely possible that some of the patients might have been infected there, although the history in this connection is negative.

CONCLUSIONS.

It is improbable that there was any common source of infection for all of the cases, and their occurrence within such a short period of time could not have been more than a coincidence. The fact that all the patients used water from cisterns which were all liable to contamination and had not been cleaned for sometime directs considerable suspicion at this source of drinking water. In Cincinnati in 1911, 12 per cent. of all the cases of typhoid fever were supposed to have been due to cistern water. Further, the fact that all of these cisterns were placed within a very short distance of insanitary privies is a further cause of suspicion. The fact that the striking distance of the common house fly is not over 200 feet would exclude all but one case from this source of infection. The history, indefinite in nearly all cases, of having visited a number of other cities and villages during the thirty days previous to the onset of symptoms must be regarded with suspicion, although it is impossible to say definitely that any case was infected outside of Glendale. The public water supply as a source of infection is beyond suspicion.

RECOMMENDATIONS.

No recommendations were made at the time of this investigation, since it was not possible to say exactly how the cases became infected and it was thought that if further cases developed more light would be thrown upon the source. However, no further cases developed and the following recommendations were therefore submitted:

1. Cisterns and wells should be examined and repaired if necessary so as not to allow of further contamination. If it is proven that there has been contamination a certain amount of hypochlorite of lime

should be added to the water at stated intervals, the quantity to depend upon the size and depth of the cistern or well.

2. The insanitary privies now in use should be cleaned and filled up and new and sanitary privies should be constructed in accordance with the rules and regulations of the Building Code. This is an important measure, for Glendale being a suburb of Cincinnati and having direct communication therewith by means of traction lines, is apt to be a breeding-ground for water-borne diseases and to be the cause of their spread in the nearby centers of population.

TYPHOID FEVER EPIDEMIC AT WILLOUGHBY.

On September 28th, 1911, the epidemiologist made an investigation of an epidemic of typhoid fever at Willoughby, in compliance with a request from Mr. Smock, president *pro tem.* of the board of health. His report follows:

Willoughby is a village situated in Lake County and having a population of 2,072. Typhoid fever has been endemic at Willoughby for some years and in August, 1909, an epidemic was investigated by an inspector of the State Board of Health, who came to the conclusion that the outbreak was due to the water supply. The system of water purification then in vogue at Willoughby is still in use, and it was pointed out by the Secretary at that time that this system had never been approved by the State Board of Health and that it was not to be depended upon for a safe water supply. Further than an attempt to prevent the pollution of the stream above the intake, nothing more was done.

The present epidemic started in July, the first case being reported toward the end of the month.

From July 4th to September 16th, inclusive, there were reported 34 cases, including two deaths, a mortality rate of 6 per cent. These cases were divided as to age in the following manner:

First decade.....	11 or 32%.
11 to 15.....	5 or 14%.
16 to 25.....	6 or 17%.
26 to 35.....	4 or 11%.
36 to 45.....	4 or 11%.
46 to 55.....	2 or 6%.
56 to 65.....	2 or 6%.
Total	34

There were 16 females and 18 males.

Disinfection carried on by those caring for the sick was marked "good" in 29 cases; "poor" in 2, and there was no attempt at disinfection in 3.

tion in two cases. Those cases marked "good" usually employed a trained nurse. Those marked "poor" had overlooked some important detail of the disinfection such as omitting to disinfect clothes, eating vessels or hands.

The cases were fairly well scattered over eleven streets, but there were nine houses which had two or more cases. In one of these houses at least these were probably contact cases.

All cases had used city water during the incubation period. Many had ceased to do so after the epidemic started.

Raw food and vegetables were purchased from different groceries and wagons and the sources of these were so varied that they could not explain a common infection such as this epidemic undoubtedly was.

Many of the cases had visited Willough Beach during the incubation period, and a report of a former investigation of Willoughby by a medical inspector calls attention to this fact; but in the present instance all the cases did not visit this park and the fact that there was such a large percentage of cases among those under ten years of age who did not visit the park rules it out as a common source of infection. Other places visited by cases during the incubation period were Cleveland, Euclid Beach, Painesville, Oberlin, etcetera. These visits did not seem to have much bearing on the source of infection.

Nine of the 34 cases lived in houses without sewerage connection, and in some instances the privies used by these were situated on a high bank of the river considerably below the intake and the sewage seeped directly into the river.

Although the mortality percentage was 6 per cent, clinically the cases were divided as follows: Mild 15; moderate 15; severe 4. There were few complications such as hemorrhages, no cases of perforation, and those cases designated as severe suffered only from hyperpyrexia or a lengthy convalescence. Milk was secured in every instance during the incubation period from Pelton's dairy, and this has an increased significance when there is added to it the fact that 32 per cent. of the cases were under eleven years of age. Other milk was also used by some families during the period of incubation, but in addition milk was taken from Pelton's dairy wagon occasionally or, what was more common, the family had just recently changed dairies.

From a study of the above facts it is evident that there must have been some common source of infection. A further study will eliminate all but two sources, the milk and the water.

Water. This has been shown to be polluted both from a study of the stream, which has abundant opportunity to become polluted a short distance above the intake, and from bacterial analyses. *B. coli* were found in the water from the distribution points in September. The Cook strainer system overlaid with four or five feet of sand and gravel is employed and it is useful merely in clarifying the water from the tur-

bid stream. When high water comes it is inefficient and a temporary pollution will lead to disastrous results.

Milk. There are two facts that stand out strongly in this connection, the first that all the cases used milk from Pelton's dairy during the incubation period, and the second that 32 per cent. of the cases were under eleven years of age. An examination of the dairy revealed no cases of sickness among the employes or family, neither was there any typhoid or other fever in the farmhouse from which the dairy was in the habit of supplementing its supply of milk. It is to be noted, however, that this dairy supplied a house in July where there were two cases of typhoid, the first of which was not recognized as typhoid fever until some time had elapsed, so that the proper precautions of disinfection were not carried out from the start. Nothnagel's Encyclopaedia of Medicine mentions that four-fifths of all cases of typhoid occur between the ages of 15 and 35, leaving only one-fifth for the first and later years of life. It is reasonable to suppose that when the figures are reversed as in this case, the cause must be some infection of food commonly used by children, and of course milk stands first in this category.

CONCLUSIONS.

The epidemic was due to one or more temporary pollutions of some vehicle commonly used.

This vehicle was used to a greater extent by those under 11 years of age than by any others.

Water was probably the primary cause of the infection, either by causing the first case from which the other cases were infected or by infecting the vessels used to carry milk in washing them.

It is reasonable to suppose that milk was directly responsible for the epidemic.

RECOMMENDATIONS.

The village of Willoughby employed an expert to install a temporary chlorine plant to disinfect the water and this plant was already in use. There was, therefore, no immediate danger from this source.

Regarding the milk question, it was recommended that such rules and regulations be drawn up in regard to the preparation and distribution of milk as to obviate any future epidemic from such a source.

NOTE.—The State Board of Health recommended that the local board of health adopt milk regulations.

TYPHOID FEVER AT NEW ATHENS.

A number of cases of typhoid fever at New Athens in September and October led Doctors J. A. Hobson and V. N. Marsh to solicit aid of the State Board of Health to investigate the causes of the outbreak, and the epidemiologist was sent to direct the local board of health to—

ward this end. Dr. Pettay, of New Athens, secured the data on which the following report is based:

The village of New Athens is situated among the hills of Harrison County and has a population of 376. No railroad nor interurban line reaches it. There is no common system of sewerage nor is there a public water supply, reliance being placed upon privies and wells. The character of the soil renders the latter very easy of pollution unless extraordinary precautions are taken.

On August 29th the first case of typhoid fever appeared and since then there have been fifteen cases, the last to contract the disease taking to bed on October 19th. The cases developed as follows:

August	29th.....	1 case.
"	31st.....	1 "
Sept.	4th.....	1 "
"	5th.....	1 "
"	6th.....	1 "
"	7th.....	1 "
"	10th.....	3 cases.
"	12th.....	1 case.
"	16th.....	1 "
"	19th.....	1 "
Oct.	2nd.....	1 "
"	4th.....	1 "
"	9th.....	1 "
"	19th.....	1 "
Total		16 cases.

The first symptoms appeared in the first case on August 19th, and in the last on October 19th, a period of two months.

No details relative to the street or situation of the house were supplied, but from a survey of the village it was evident that the disease was not confined to any particular neighborhood.

Each patient used water from his home and in addition from the following places:

- 3 from Hughes well.
- 2 from the Mien well.
- 3 from the Cobb well.
- 2 from various places.
- 2 from Fields well.
- 1 from school well.
- 1 from Justice well.
- 1 from Harris and Sewell well.

In connection with the school well, it is probable that all children who attended school used water therefrom, although it was not so stated in the report.

No details were given concerning visits made during the period of incubation.

The milk supply was apportioned in the following manner:

Mr. Culbertson supplied 5 cases.

Mr. Dunfee supplied 3 cases.

One used milk from one cow.

Mr. Morris supplied 4 cases.

Used no milk, 1 case.

The occupations appear to have no connection with the cause, except that five of the cases attended school.

The sixteen cases occurred in seven houses, an average of 2.28 cases to a family.

Of fifteen patients in which the ages were given:

5 or 33.33% were under 10.

2 or 13.33% were between 10 and 15.

4 or 26.66% were between 25 and 40.

3 or 20 % were between 40 and 67.

The youngest case was $2\frac{1}{2}$ years; the oldest, 67.

Discussion of Data. The appearance of symptoms lasted over a period of two months, indicating that a temporary infection of some public utility such as milk or water could not explain the origin of all the cases. It would require repeated infections of such a vehicle to originate the outbreak.

The sixteen cases occurred in seven houses, and in all of these the first case appeared at least four days before the others, so that many of the cases could have been due to contact infection.

If the details given the drinking water used are correct, then this source could be ruled out as a cause of the outbreak. As many of the cases attended school, however, it is probable that all of them used water from the school well. In no other case did more than two patients obtain water from the same well, with the exception of the Cobb and Hughes wells, from which drinking water was taken by three patients each.

The milk supply came from four different sources. The milk man who supplied the largest number of cases had no typhoid fever in his family. It is worthy of note, however, that he supplied four of the five cases under the age of ten.

The ages of the patients form a very significant factor in the discussion of the data, over 46 per cent. being under the age of fifteen. This would indicate that the vehicle of infection responsible for the largest number of cases was one used largely by children of school age. Such a vehicle is milk, or water from the school well. Four of those of school age took to bed between September 5th and 12th. This would

cast additional suspicion on the school well. Had details been given concerning the occupations of the patients, the data could have been more easily interpreted.

CONCLUSIONS.

(1) It does not appear that any well but that used in common by school children was responsible for the outbreak of typhoid fever.

(2) Milk may have been responsible for some cases but this is not clear.

(3) Contact infection is a logical and probable cause for some of the secondary cases in families having more than one case.

(4) There is no information concerning the probable cause of the infection of the first patient. If typhoid fever has not been present in New Athens for some time, then the infection must have come from some outside locality, since even if a well is polluted it cannot be a cause of typhoid fever unless the pollution include some feces or urine from a case of typhoid fever.

RECOMMENDATIONS.

It was recommended that further information be sought concerning the whereabouts of the first case during the period of incubation.

The local board of health desired to have the water of a number of wells examined, and it might be of value to have the school well and those wells where more than two cases used water, namely, the Hughes and the Cobb wells, examined. It did not appear that it would be of any advantage to examine any other wells, since from the data furnished by the local board of health no other well could have been responsible for more than one case, and no well was incriminated even to such an extent.*

TYPHOID FEVER EPIDEMIC AT STAFFORD.

On October 7th, 1911, in compliance with the request of a number of residents of Stafford, the epidemiologist visited that village to investigate the measures being taken by the local board of health to control the spread of typhoid fever. The report follows:

Stafford, a village with a population of 174, is situated in Monroe County at some distance from a railroad traversing that county. There have been six cases of typhoid fever reported within the past few weeks and none of them have as yet recovered. Three of these cases were within and three without the village limits.

*No more cases of typhoid fever developed. Analyses of water from the school well showed sewage contamination and a large amount of pollution in the past. It was recommended that drinking water from it should be boiled. Two other wells examined showed even more pollution and may be taken as types of the ordinary well in New Athens.

There was some confusion existing as to who was entitled to the position of health officer and this had resulted in a deadlock, so that nothing had been done to restrict the spread of typhoid fever or to ascertain the cause of its prevalence. Council showed general indifference to health matters in Stafford. The mayor and council were advised to appoint a health officer and promised to aid him in discovering the cause and restricting the spread of typhoid fever. From a cursory survey of the field, no common cause for the infection was discovered, but further investigation might have led to different results.

NOTE—On October 10th, 1911, word was received that a health officer had been appointed. No more cases of typhoid fever were reported.

DIPHTHERIA AT ROSEVILLE.

On October 9th, in compliance with the request of the health officer, the epidemiologist visited Roseville to investigate an outbreak of diphtheria. The following is his report:

Roseville is a village of 2,113 inhabitants, situated on the border line separating Muskingum County from Perry County, and so being a part of both counties.

The outbreak of diphtheria has been confined to the public school. This school opened in September and since that time there have been six cases of diphtheria among the pupils, two being sick at the time of the investigation.

There has been considerable agitation on the part of the laity on the question of the advisability of closing or allowing the school to remain open.

The two cases of diphtheria were visited. They both presented a typical clinical picture of pharyngeal diphtheria, with a moderate increase of temperature, characteristic false membrane over the uvula and tonsils, and muscular weakness and prostration. One of these cases did not respond readily to antitoxin and the attending physician was advised to increase the size and frequency of administration of his doses.

The health officer was advised that the school would be allowed to remain open, providing that all known exposures were properly isolated and quarantined and the two rooms from which all the cases were seized, be disinfected. It was also recommended that those exposed be given an immunizing dose of antitoxin of not less than 1000 units. Further, it was recommended that a physician be employed by the board of health to make a daily inspection at the school in order to detect and isolate early cases of diphtheria, should such arise.

NOTE—Later correspondence with the health officer elicited the information that these measures of prevention were successful in preventing the further development of cases of diphtheria.

INVESTIGATION OF DIPHTHERIA AT JERRY CITY.

At the request of the health officer, Mr. R. J. Palmerton, and a petition signed by a number of citizens, the epidemiologist visited Jerry City, October 13th, 1911, to investigate an outbreak of diphtheria, and made the following report:

Jerry City is situated in Wood County and has a population of 458.

Diphtheria broke out in Jerry City a short time ago, and there have been twelve cases to date with two deaths. All the other cases are convalescing at the present time, but the majority of them are still under quarantine.

The school was closed several weeks ago when the first two cases of diphtheria broke out among the scholars. The building was thoroughly disinfected by means of formaldehyde gas liberated with potassium permanganate. After being closed a week the school was reopened and another case developed the same morning, so the school was closed again at once. This occurred on October 2nd, and the school has been closed ever since. Three cases only developed in school, and in one of them at least the disease must have been present before coming to school.

The health officer has carried out the quarantine among those who have diphtheria and those who have been exposed to the disease in an admirable manner. Since no cases have been reported for about a week it is evident that this quarantine is effectual.

The cases are scattered, but have occurred in such a way as to lead to the belief that the infection took place through personal contact before the diagnosis was made, which is the most frequent method of infection.

Clinically the cases are very malignant, there having been two deaths and a number of adults have been infected.

CONCLUSIONS.

From a study of the above facts it is evident that the action of the health officer in closing the school was the rational one, since the school formed a meeting place for all the children and there was no way of having the children watched by some one competent to decide as to which children had suspicious throats. The prompt disinfection of the building is also to be commended.

The disease seems to be at the present well under control, and if the health officer has the support of the citizens in carrying out the measures of quarantine he has inaugurated there should be no further trouble beyond the seizure of those children or some of them who have been recently exposed.

The following recommendations were furnished the health officer at Jerry City:

(1) That the measures of quarantine already employed be continued until all cases have recovered and exposed persons can be released.

(2) That the health officer have the school building thoroughly fumigated according to the regulations of the State Board of Health.

(3) That if the health officer can secure the services of a competent physician to make a daily examination of all those children attending school to find any who have any of the premonitory signs and symptoms of diphtheria, the school be allowed to reopen after being thoroughly fumigated.

Note. The measures inaugurated by the health officer proved effectual.

INVESTIGATION OF DIPHTHERIA AND SCARLET FEVER AT PORTSMOUTH.

Information was received on October 21st that there were a large number of cases of diphtheria and scarlet fever at Portsmouth, Ohio, and the epidemiologist visited that city on October 25th and 26th. The following report was made:

The city of Portsmouth is situated in Scioto County, of which it is the county seat, and has a population of 23,481.

Contagious diseases have been prevalent in Portsmouth for some time. The following is a list of cases of diphtheria and scarlet fever reported to the health officer during the past four years:

	<i>Diphtheria.</i>	<i>Scarlet Fever.</i>	<i>Deaths.</i>
1907	136	9	8
1908	74	3	5
1909	36	5	1
1910	57	27	0

The death rate has been rather high during these four years from diphtheria, all the deaths occurring from that disease.

Percentage of deaths in 1907.....	.059—nearly 6%
Percentage of deaths in 1908.....	.068—nearly 6%
Percentage of deaths in 1909.....	.027—nearly 3%
Percentage of deaths in 1910.....	none reported.

In 1911 the cases were reported as follows:

	<i>Diphtheria.</i>	<i>Scarlet Fever.</i>
January	1	2
February	4	1
March	4	1
April	0	1
May	1	3

	<i>Diphtheria.</i>	<i>Scarlet Fever.</i>
June	0	0
July	11	1
August	24	14
September	56	27
October	55	22
Total	156	71

Deaths 6, all from diphtheria.

Percentage of deaths from diphtheria, 3.8%.

From the above statistics, it is evident that up to October 25th, 1911, there have been more cases of scarlet fever and diphtheria in Portsmouth than for at least four years previous. The number of cases of scarlet fever per 1000 inhabitants is, therefore, 3.02, which is very high. The number of cases of diphtheria per 1,000 inhabitants is even higher, being 6.64.

The usual means of quarantine as prescribed by the State Board of Health were carried out in these cases, with the exception of fumigation. Instead the floors were washed with an antiseptic solution. This information was obtained from the health officer. It may be that in many cases fumigation was resorted to, but in some cases, according to the health officer, this was not done.

Information relative to the date of report of the cases, the name, address, date of disinfection and discharge, and the deaths, was kept by the health officer. There was no information tabulated relative to the supposed source of infection in any of these cases. Information to the effect that about three-fourths of the cases used milk from the same jobber was furnished by the health officer, but no details concerning the milk used by each case was kept.

The cases were scattered over the entire city, the largest number occurring in the ward where the population was most dense. The 77 cases of diphtheria and scarlet fever in October were scattered over 41 streets, giving 1.87 cases per street, and no street or locality having an undue prevalence.

Attention was drawn to the milk as a source of infection, as it is well known that it is second only to contact as a source of infection. The largest jobber was visited and the following information obtained:

Milk was received from about forty farmers. These lived at a greater or lesser distance from the city so that the milk had to be shipped by rail in many instances. The owner of the business stated that it was known to him that at none of these supply houses was there a case of infectious or contagious disease. Some time since a case of scarlet fever developed among his employes, but he had been ordered to remain at his home before the diagnosis was made. This was corroborated by the health officer.

The milk as it was received at the distributing house was poured into a large tank, weighed, and then poured into a pasteurizer heated to 158-162° F. In this it did not remain more than a few minutes. The milk was then bottled and distributed after thorough cooling.

The bottles were washed in very warm, but not boiling water. About 650 gallons of milk were thus treated daily, but only a portion of this was retailed, the remainder being sold to retailers, ice cream manufacturers, etcetera.

The cans in which some of the milk was distributed were washed and then sterilized for a few moments with live steam.

The plant on the whole was as sanitary as could be expected.

It is evident that there has been an unduly large amount of diphtheria and scarlet fever in Portsmouth during 1911 and some of the previous years. The seasonal prevalence of scarlet fever and diphtheria in Portsmouth shows that the months of September and October were the periods in which the greatest number of cases occurred. This corresponds with experience in other parts of this country and elsewhere. It is probably not largely influenced by the opening of the schools as a large increase is noted in August and the first few days of September before school opens, and the number of cases per day is not much greater in the last days of the month than in the first.

The fact that Portsmouth has not had much scarlet fever and diphtheria until 1911 since 1907 is explained by the fact that that period of time is about that required for a new generation of children to grow up who have not had the disease and are, therefore, susceptible.

The unduly high morbidity rate from scarlet fever and diphtheria is evidence of the fact that the quarantine has not been successfully carried out, since personal contagion is the greatest factor in the spread of both these diseases. The proper carrying out of quarantine depends not only upon the health officer but also upon the family physician and the family. If the family are not properly instructed they cannot take proper care of the sick, and if they do not carry out the physician's orders they are responsible for spreading the contagion.

The death rate from diphtheria is rather high for cases cared for at home, since it equals the rate from many hospitals to which only the worst cases are sent.

The milk is sometimes responsible for an outbreak where bottles are taken into the quarantined houses and returned to the milk man. In this case, however, the health officer stated that no bottles were left at houses which were quarantined, or if left, were not returned until the quarantine was lifted.

The sterilization of the milk by the Pasteur method as practiced in the supply house visited was not enough to thoroughly purify the milk of disease germs, since a longer exposure is necessary to kill the various bacteria and their spores. When it is known that there are no

sources where infection could reach the milk, the above pasteurization is quite sufficient and leaves the milk in better condition for infants than would a longer exposure.

From the location of the cases and their occurrence in sets of three and four for long periods, it is not probable that milk is responsible for a large number of the cases. More definite information is needed, however.

The following recommendations were made:

All persons suffering with scarlet fever and all who have been exposed and might contract the disease, should be quarantined for ten days after complete desquamation and discharge from the nose, throat and ear has ceased.

All persons suffering with diphtheria with all who have been exposed to the disease, should be quarantined for fourteen days after all throat symptoms have disappeared.

In all cases disinfection should be practiced in accordance with the instructions of the State Board of Health when the patient is ready to be discharged.

Inasmuch as the information relative to each case was meagre, it was recommended that the following details be secured for each case by the health officer or assistant: Name of patient, age, sex, address, when infected, date of first symptoms, whether exposed to another case, where milk is obtained, visits in and outside of city a fortnight previous to illness, and any other information relative to the disease or its possible source.

Inasmuch as the milk from one source, Mr. Cranstoun's supply house, was supplied to a majority of the cases, it would be well to have installed some form of apparatus, preferably steam, to thoroughly disinfect the bottles.

When the information referred to above has been collected, the special sources of danger discovered can be more thoroughly dealt with.

EPIDEMIC OF ANTERIOR POLIOMYELITIS AT CINCINNATI.

On November 3rd and 4th, the epidemiologist visited Cincinnati for the purpose of learning the methods used in combatting the epidemic of infantile paralysis in that city, and reported as follows:

Cincinnati has just passed through an epidemic of infantile paralysis. The word "epidemic" is used advisedly, for although the same number of cases of the ordinary contagious diseases would not be a cause for alarm in a large city like Cincinnati, yet the number of deaths from this cause outnumbers those from any other contagious disease for the same period.

Since September 1st, 1911, and up to November 4th, 83 cases have been reported. Covington, Kentucky, had passed through an epidemic a short time previous, having had 45 cases.

By far the largest number of cases in Cincinnati have occurred since September 23rd.

Dr. W. H. Frost, passed assistant surgeon of the United States Public Health and Marine Hospital Service, has been appointed to investigate the cases from an epidemiological point of view in order to obtain data which will enable him to study those symptoms which occur early in the disease so that it may be recognized prior to the paralysis. Dr. Frost supplied the following details:

There is no special grouping of the cases in any locality.

There is no instance of two cases having occurred in any one family.

From 90 per cent. to 95 per cent. of the cases were between the ages of one and five, with the majority between one and two.

There have been 26 deaths, a percentage mortality of 31.3 per cent.

There appears to be no connection between the epidemic and the milk supply.

There is no particular focus, such as a school, etcetera.

Preventive Measures.

The measures enforced by the health officer, Dr. J. H. Landis, are as follows:

All cases are required to be reported to the health office. Any case of meningeal affection is investigated, lest it might be a case of infantile paralysis, and any such case that in the opinion of the investigator seems suspicious, is treated as a case of infantile paralysis.

The houses in which such cases occur are placarded with a sign stating that there is contagious disease within.

All children connected with a case are taken out of school for a period of three weeks.

The patients are isolated as much as possible, and especially are children kept away from a case.

Those who have come in contact with a case are kept away from children as much as possible, and isolated, with the exception that "bread winners" are not kept away from their work.

In case of death the funeral is required to be a private one, and must take place within twenty-four hours.

The cases have developed at the following rate for the past three weeks:

Week ending October 21st, 14 cases reported.

Week ending October 28th, 14 cases reported.

Week ending November 4th, 12 cases reported.

From a consideration of the above data it is evident that everything possible is being done that can be done in the light of our present knowledge of this dangerous disease.

The precautions taken are comprehensive and at the same time reasonable, and it might be well to adopt the same if cases occur elsewhere in Ohio.

INVESTIGATION OF SMALLPOX AT DEFIANCE.

At the request of Dr. J. D. Westrick, health officer, the epidemiologist visited Defiance on November 7th, and made an investigation into the methods used in the prevention and restriction of smallpox. The report follows:

Defiance is situated in Defiance County, and has a population of over 7,000.

Smallpox was first reported to the health officer on October 19th, but it was thought that there were several cases previous to this which had not been recognized. From October 19th to November 4th, 29 cases have been reported, and on November 7th, the health officer stated that there were 11 more cases.

It was thought by some physicians that the disease was not smallpox, it being called "Cuban Itch." The fallacy of mistaking mild cases of smallpox for this disease was exploded some years ago.

Three cases of the disease were seen at Defiance. One case was in the convalescent stage, and the unruptured pustules on the face and palms of the hands, the site of the lesions, and history were very characteristic of smallpox. One case had the eruption in the frankly pustular stage. Characteristic pustules were seen on the palms of the hands and face.

Taking into consideration the appearance of the rash, the fact that it appeared in crops, and the age of the patients, no other conclusion can be arrived at, but that the disease is smallpox. The age of the patients was as follows:

10 and under.....	9
20 and under.....	6
30 and under.....	7
40 and under.....	2
50 and under.....	3
Over 50.....	1

Chickenpox, the disease most likely to be confused with smallpox, is essentially a disease of children and rare in adults.

The measures taken by the local health officer and health board to control the disease are as follows:

(1) An endeavor to have an early report upon all cases of smallpox or diseases resembling it. A circular letter was issued to all physicians in regard to this.

(2) The quarantine and isolation of all cases of the disease and contacts.

(3) The question of a smallpox hospital came up and it was resolved by the board of health to secure one if possible.

(4) The schools had been closed for a week and then reopened. Fumigation was practiced in any school room where there had been an exposure.

The following recommendations were made:

Inasmuch as the disease has occurred altogether among those who have not been recently and successfully vaccinated, it would be wise to require that all children who attend school be required to show a certificate of successful and recent vaccination. This certificate should be signed by a physician.

The measures of quarantine and isolation required by law should be strictly enforced.

Since a physician is employed by the board of health to attend all cases of smallpox, it would be well to have him inspect the pupils in the schools periodically, so that any early cases of the disease would be detected at their inception.

With the above measures properly carried out it is probably not necessary to construct a pest house, although it would be an aid to the enforcement of quarantine and isolation.

The question of closing schools and public gatherings of every kind came up, but considering the state of the disease, with all cases and all unvaccinated exposures quarantined, this seemed to be an unnecessary precaution.

NOTE — A few cases continued to develop at intervals, but the epidemic subsided as a whole. The above recommendations were carried out.

OUTBREAK OF TYPHOID FEVER AT XENIA.

On November 20th, at the request of the health officer, Dr. Messenger, the epidemiologist visited Xenia to investigate the cause of the outbreak of typhoid fever. The report follows:

Xenia is a city of 8,706 inhabitants, situated in Greene County.

The outbreak of typhoid fever consisted of four cases. One case occurred about a month previous to the investigation, and the remaining three cases took sick within fourteen to twenty days. Details of each case were sought and from these it appeared that all the cases were supplied with milk from the same supply house. The dairy was investigated and found to be lacking in all modern equipment, but there

were no cases of typhoid fever among the family or employes, nor had there been any previously.

The fact that this dairyman had supplied the first case, which developed some fourteen to twenty days previous to the others, that he had no proper sterilizing apparatus, and that the later cases had used only his milk, was very suggestive and prompt precautions were taken to prevent any further spread of the infection. He was ordered to install proper sterilizing apparatus immediately, and among other instructions was told never to leave or return milk vessels from a house having a contagious or infectious disease within. He was also instructed in the law dealing with report of cases of any infectious or contagious disease among his family, employes or customers.

Further investigation revealed that the first case reported had taken sick elsewhere, and therefore conditions at Xenia were not responsible for the outbreak.

NOTE—No further trouble was experienced and the outbreak subsided, according to later correspondence.

INVESTIGATION OF THE CAUSES OF THE PREVALENCE OF TYPHOID FEVER AT SPRINGFIELD.

On November 20th, 1911, the epidemiologist made an investigation at Springfield in compliance with the request of Dr. I. E. Seward, health officer, to determine the causes of the excessive morbidity from typhoid fever in that city, and to suggest measures to restrict and prevent this disease. The report follows:

The city of Springfield is situated in the central part of Clark County, and has a population approximating 50,000. It is traversed by several interstate railroad and local traction lines, and owing to this and the fact that it is a manufacturing center, there is always a large floating population. The growth in size of the city has been fairly rapid in the last few years, and hence it is natural that the city should have outgrown its water plant and sewerage system.

To make the investigation as complete as possible it was decided to ascertain the number of cases of typhoid fever each year for the last ten years. There was considerable difficulty experienced in doing this, since the reporting of cases to the health office has been very much neglected in the past. The following figures were, however, available:

In 1901-2-3 only deaths were reported.

<i>Year.</i>	<i>Deaths.</i>
1901	10
1902	20
1903	17

Taking 10 per cent. as the average percentage of deaths, the number of cases which these figures represent are 100, 200 and 170, respectively.

From 1904 to 1910 many of the cases were reported.

<i>Year.</i>	<i>Cases.</i>	<i>Deaths.</i>	<i>Percentage Mortality.</i>
1904	90	23	25.5%
1905	68	11	16.1%
1906	38	16	42.1%
1907	78	15	19.2%
1908	57	9	15.7%
1909	23	6	26.0%
1910	16	5	31.2%
Average percentage mortality.....			31.2%

It is obvious that there exists a considerable discrepancy between the number of cases and the number of deaths reported.

The percentage mortality of 22.9 per cent. is much too high, and indicates that only a part of the typhoid in Springfield was reported. Again, taking ten as the average number of deaths per 100 cases, and estimating the number of cases from the number of deaths, it is found that there have been, approximately, 1320 cases of typhoid fever from 1901 to 1910 inclusive, or an average of 132 cases a year. The number of cases thus estimated for 1904 is 230, and for the following years in their order, 110, 160, 150, 90, 60, and 50. This indicates one of two things,—either that the morbidity and mortality from typhoid fever is steadily diminishing, or that the cases and deaths are not all being reported, or incorrectly reported. It is probable that both of these factors are present, and must be borne in mind before too much reliance is placed on these statistics.

The engineering department of the State Board of Health estimated that in Springfield from 1890 to 1908 the death rate from typhoid fever averaged 42 per 100,000 of population. This is higher than the rate in Boston, New York, Philadelphia and many other cities for that period, and it must be remembered that the problems of a pure water supply and sewage disposal assume much larger proportions in the cities mentioned than in Springfield. If the data obtained from the office of the board of health for the years 1909 and 1910 are correct, then the rates of 10 and 12 for those years is not excessive, equalling New York and Boston and being less than that of Philadelphia. As far as could be ascertained, the efforts to reduce typhoid fever in Springfield have been desultory, consisting only of attempts to obtain a water supply of good quality and sufficient quantity. Accepting the statistics as correct, Springfield has been very fortunate in having obtained such a reduction in the morbidity and mortality from typhoid fever, and when so much

has been accomplished with so little effort, it should be an encouragement to the health department to expend more time and money to the end of reducing typhoid fever to a negligible quantity.

At the time of the investigation it was evident that Springfield physicians were not in the habit of reporting their cases to the health officer. It was with the greatest difficulty that reports of all cases were obtained. Finally 43 cases were acknowledged, two of these, however, being considered doubtful. Six of these cases were not found at the address given, having either left the city or changed their address. This report includes a few cases which had been thoroughly investigated by the attending physicians, to whom thanks are due. Altogether there are 36 cases here considered. They occurred in the following months:

January	1
February	1
May	1
June	1
July	3
August	5
September	8
October	11
November	5
Total	36

Although the incidents of typhoid fever usually increases during the autumn months, this increases in Springfield was due to special causes.

Before going into the particular conditions to which typhoid fever in Springfield is due, it might be well to briefly review the usual means of transmission of this disease, as many erroneous impressions prevail as to the manner in which typhoid is spread.

Typhoid fever is always caused by the *Bacillus typhosus*, a bacterium whose only natural breeding place is the human body. Hence the disease never occurs except by transmission, directly or indirectly, from a *previous case*. Outside of the human body the bacillus may remain alive in night soil, water, and in various articles of food, but with one exception, it does not breed in any of these. The exception is milk. The cow never originates the infection, the bacilli in the milk always coming from a case of typhoid fever in the human being. From the body of the infected person to the milk, the bacilli may travel through various channels.

- (1) Infected water used to wash the bottles.
- (2) Infection of the bottles from other sources.

The infection may then enter the milk at any time after it leaves the cow and until it reaches the consumer. Epidemics have been traced to milk bottles which become soiled with the discharges of a typhoid patient,—a customer,—and, receiving the bacilli in this manner, the bottle

is returned to the dairy, improperly, if at all sterilized, and redistributed to other customers, the original number of bacilli, many times multiplied, setting up the disease in those using the milk. The *Bacillus typhosus* may remain alive in natural waters for four or five days, in night soil probably much longer, and in ice for three months. In milk, of course, since it forms a suitable food for their growth and multiplication, the bacilli live for considerable periods of time.

The bacillus of typhoid fever leaves the bodies of those having the disease principally in the discharges from the bladder and intestines. It is found in three classes of people:

- (1) Those who are actually suffering from typhoid fever.
- (2) Those who have had the disease but have recovered. The bacilli may disappear with the symptoms of the disease, but generally persist for a week or two, after this and may continue for months and years.
- (3) Those who have never shown any of the symptoms of the disease but whose discharges can be shown to contain bacilli. This class of bacilli carriers is the rarest.

When the bacilli leave the body in these discharges, that is, those of the bladder and intestines, if not properly cared for they may infect wells through excreta from the patient seeping into the water,—public water supplies taken from a point lower down the stream than that at which the bacilli entered,—food by means of the soiled hands of attendants or nurses,—or by flies which feed alternately upon the discharges of the patient and the food,—raw vegetables and fruits in various ways,—and shell fish, such as oysters which lie in water receiving the bacilli-polluted discharges of a typhoid patient.

The *Bacillus typhosus* can infect human beings only by being *swallowed*. Hence all the safeguards to protect the public against typhoid fever must be thrown around the water and food supply. What is the best means of safeguarding these?

It would necessarily be a very difficult matter, and in fact has proven to be impossible, to see that the *Bacillus typhosus* is absent from all the food-material mentioned above. But inasmuch as no bacilli can reach such material except from a patient suffering from the disease, then it is here true that "an ounce of prevention is worth a pound of cure," and if the bacilli be gotten rid of as they *leave the patient* in each and every case, the warfare against typhoid fever, a preventable disease, is already over. This is not a theory but has proven true in many cases, notably in certain villages in Germany and in Washington, D. C.

The measures necessary to effect the death of the bacilli of typhoid fever as they leave the body are:

- (1) The isolation of the patient from the rest of the family and friends, one attendant or nurse being sufficient.

(2) The proper disinfection of the discharges from the bladder intestines and skin.

(3) The disinfection of linen, vessels used in eating and drinking, and all articles coming in contact with the patient in any way.

(4) The exclusion of flies by screens.

(5) The use of these precautions from the inception of the disease to such time after convalescence as the discharge of bacilli from the body is usually considered to have ceased.

The usual faults to be found with the way in which these simple measures are carried out are:

(1) They are not begun early enough.

(2) Not enough attention is paid to detail.

(3) Weak or improper antiseptics are used, or an efficient antiseptic may be used for too short a time.

(4) They are discontinued too soon after convalescence, that is, before the bacilli have ceased to be present in the discharges.

The observance of these measures of prevention have reduced typhoid fever in many places to almost a negligible quantity, and conversely their non-observance, has caused the disease to linger year after year in the community.

Causes of Typhoid Fever at Springfield. The causes of typhoid fever vary only in the proportion of cases for which they are responsible,—the same causes are always at work. Springfield is peculiar in this, that a large number, comparatively, of the cases reported this year were taken sick or received their infection elsewhere. This is to be accounted for by the large floating population above mentioned.

Synopsis of Data Obtained. The 36 cases investigated occurred among 32 families. The ages of the patients were as follows:

	10 and under.....	4 or	11.4%
Between	10 " 15.....	4 "	11.4%
"	15 " 20.....	4 "	11.4%
"	20 " 25.....	6 "	17.1%
"	25 " 30.....	6 "	17.1%
"	30 " 35.....	6 "	17.1%
"	35 " 40.....	2 "	5.7%
"	40 " 45.....	2 "	5.7%
"	45 " 55.....	1 "	2.8%

There were 25 males and 11 females.

The cases were well scattered over the city according to residences, no one locality having an undue prevalence. If the places of work, instead of the residences of the patients are taken as a guide, then that portion of the city where the plant of the International Harvester Machinery Company is located shows a disproportionately large number of cases.

Details concerning the disinfection practiced were obtained, where possible, from the nurse or attendant, or failing that, from the patient or some other member of the family. A somewhat arbitrary classification was adopted whereby the disinfection in each case was marked "good," "fair," "poor," "none," according to the thoroughness of the process as applied to the discharges, linen, vessels, etcetera, of the patient and the attention to detail, as well as the kind and strength of the disinfectant used and the length of time it was applied.

In 3 of the cases none was practiced.

In 2 of the cases it was poor.

In 6 of the cases it was fair.

In 12 of the cases it was good. *

Nine of the cases were treated in the hospital.

Although this is a comparatively good showing, it must be remembered that it leaves much to be desired. In all cases where details were obtainable, it was found that no disinfection was practiced until the diagnosis was made, and the diagnosis was delayed in many instances for some time after the onset of the initial symptoms.

Of 19 cases who had not forgotten details of their illness, it was found that an average of 7 days elapsed from the date of the initial symptoms to the date when the physician was first called, a total of 138 days. The shortest period was 2 and the longest 21 days.

In those cases which were reported to the health officer at the time of illness,—a very few,—the average period elapsing from the physician's first visit to the date of the report, which may be considered to be the date on which the diagnosis was made, was a fraction less than 4 days, and gives a total of 27 days for nine patients. Taking the figure 4 as the average for all the cases, there would be a total of 148 days.

The occupation of the patients indicated that the disease was especially prevalent among the working classes.

19 belonged to the laboring classes, mechanics, moulders, carpenters, etc.

7 were school children.

6 were in business and kept drug stores, dry goods stores, etc

3 did house work.

1 was a farmer.

In 1 case work was not known.

Among the 32 families there were 17 wells. Thirteen of these were in regular use, the remaining 4 either not being used for drinking water, or used only occasionally, or as a depot for kitchen and other waste.

Thirty-three of the 36 patients gave a history of having used well or spring water during the 30 days preceding the onset of their illness.

It was difficult to learn definitely how many had used the public water supply, but the large majority could not say that they had not used it at some time during the 30 days preceding their illness.

Raw food, such as fruit and vegetables, was secured from various sources.

9	patients	secured	such	food	from	their	gardens.
13	"	"	"	"	"	"	13 different groceries.
5	"	"	"	"	"	"	the city market.
1	"	"	"	"	"	"	a wagon.

Others could not remember or had secured such food from all or several of these sources.

The milk used by patients was also varied in source.

There were ten supply houses, and five patients had a private supply.

The Springfield Pure Milk Company supplied.....	16 cases.
The Home Dairy Company supplied.....	6 "
Bowles and Argobright supplied, each.....	2 "
Other supply houses supplied only one each.	

Only 9 of the 36 cases, or 32 families, had their houses connected with the common sewer. The remainder, 23, used ordinary out-door privies, these privies lacking in almost every instance the three essentials of a sanitary privy:—that it should be:

- (1) Watertight.
- (2) Animal-proof.
- (3) Fly-proof.

In practically all cases the privy was too close to the well,—the former allowed of soil pollution, the latter of contamination, being unprotected from surface contamination and sub-soil seepage,—ideal conditions for a small house or neighborhood epidemic.

There was an average of 4.2 individuals to a family.

Six of the patients gave a history of direct contact,—that is, they lived with, or cared for, a patient in the febrile period of the latter's disease. This contact in all cases took place approximately 14 days prior to the date of onset, the commonest duration of the period of incubation.

Nine gave a history of having been away from Springfield during the 30 days previous to the date of onset, in a locality where typhoid fever was prevalent, four taking sick while away.

The grade or severity of the disease was recorded as follows:

13	cases	were	light.
10	"	"	moderate.
6	"	"	severe.
3	"	"	very severe.
1	"		died.
1	"		had a relapse.
1	"		had complications.

Discussion of Epidemiological Data. The causes of typhoid fever in Springfield during 1911 were responsible for the following number of cases respectively:

Contact, 5 cases.

Well water, 2 cases.

Untreated creek water, 12 cases.

No special source of infection discovered, 8 cases.

Infected outside Springfield, 9 cases.

Those attributed to contact infection gave a history of actual contact with a patient having typhoid fever, taking sick approximately fourteen days after this, and nothing in the history or surroundings to suggest any other cause.

Those cases caused by drinking well water, secured this water from a well liable to pollution from a privy in which the improperly disinfected discharges of a typhoid fever patient were being placed at the *time*.

The twelve cases attributed to untreated creek water were in the employ of the International Harvester Machinery Company. This company has two principal sources of water supply, one the city water, and the other untreated creek water. These two supplies are separated only by a valve in the main. The creek water is used only in cases of emergency, when the city supply fails as it has frequently done in the past. It is notorious that a double water supply such as is used by this company is a danger to those consuming it, if one of the sources is not free from contamination. A valve will leak, depending upon the relative pressures of the water on either side of it; and in this case the untreated creek water was always at a higher pressure than the city supply. The valve will also be opened occasionally in cases of emergency and the employees will not consider this but will continue using the water and so ingest bacilli received in the water from the discharging sewer. The use of such an arrangement has proven a fruitful source of infection in other places in the past.

Another clue which rather pointed to the fact that the plant was responsible for the infection of the twelve cases ascribed to it, is the fact that the disease among the employees occurred in the form of an epidemic. In October and the early part of November, pointing to a temporary infection of some vehicle used in common by the workman. No other cause save the water was discovered in any case, and the evidence is very strong in favor of this mode of transmission.

Of the eight cases which could not be attributed to any special cause, the fact that they used wells liable to contamination, that they numbered school boys, job carpenters, and other persons whose occupations would lead them all over the city and therefore into the danger zones,—all these facts are suggestive; but in any particular case the chain of evidence incriminating any particular cause lacked some important link. In

those who used wells liable to pollution, it could not be proven that the well had received or was liable to receive the discharges from any one having or recovering from typhoid fever, and the other cases likewise could not show a complete chain of evidence.

The nine infected outside Springfield had either come to Springfield while sick, had immediately taken sick on reaching there, or had taken sick after reaching Springfield in a period too short to have received their infection in the city. Besides this, no other evidence was forthcoming, and they had all been in localities where typhoid fever was prevalent.

Analysis of Other Data. The preponderance of males is only significant when we remember that males, because of their occupations, are predisposed to typhoid fever.

The majority of the patients were at an age when they are especially liable to the disease, namely, from 15 to 35.

The location of the patients was only significant in those who were employed at the plant of the International Harvester Machinery Company, 32 per cent. of all cases of typhoid fever in Springfield in 1911 being employed there.

The disinfection practiced by the nurses and attendants, or rather the lack of it in many cases, was probably primarily responsible for all the cases of contact infection occurring in Springfield, also indirectly for those due to infected wells, and for some of the cases whose source could not be definitely ascertained. There was a total of at least 276 days when the patients were suffering with definite symptoms of the disease but either the diagnosis had not been made or the case had not been reported. It is well known that the patient discharges bacilli from the bladder and intestines from the inception of the disease, and this period of over three-fourths of a year was sufficient to infect many more cases than were victims of the disease. This period could be shortened by:

- (1) The early diagnosis and report of all cases of typhoid fever. In this connection physicians should be reminded that the law requires the report of all cases of this disease.
- (2) The early report of all cases that are in the least suspicious.
- (3) Treating all cases of continued fever as typhoid until proven otherwise.

The oral advice of the physicians concerning disinfection is probably all that could be desired in most cases, but many people are so unaccustomed to the care of the sick that they forget and omit important details. It would be preferable to have printed instructions issued by the health office or secured from the State Board of Health, distributed among the families having typhoid fever. This would afford a ready means of reference in cases where the physician was not present and some question arose.

The following recommendations were made:

The correction of any faults incident to the public water supply does not fall within the scope of this report. It is probable that very few, if any, cases of typhoid fever in Springfield in 1911 were due to the public water supply. In the past, however, such was probably not the case. The history of the water supply in Springfield is the history of a succession of failures to provide a water of good quality in sufficient quantity for the needs of all the people and manufacturing plants. The danger of allowing manufacturing plants to introduce untreated water into the mains carrying water used for drinking purposes by the employes, is sufficiently clear and needs no further repetition. Taking into consideration the fact that from 1890 to 1908 the rate of deaths from typhoid fever was greater in Springfield than in most other cities of the same size having a pure water supply, and the further fact that the supply has been so constantly insufficient for the needs of the population and manufacturers, it is plain that any contemplated improvements should be made at once, so that Springfield could number with its other advantages a pure water supply of sufficient quantity to provide for all the population and the needs of the manufacturers and fire-fighting, and elastic enough to provide for the estimated increase in population for some years to come.

The question of wells is also important. While it is true that many wells in the rural districts are sanitary and their water safe, this is not always the case and much less so in a city where the dangers of pollution are multiplied and the safeguards diminished. The area of the average city lot is so limited that the well cannot be placed at a proper distance from the privy, or a source of pollution on the neighboring premises. The law requires that a privy shall not be placed nearer to a well than 50 feet either on the same or a neighboring lot. In Springfield in most cases investigated no attempt was made to comply with this law. Further, the wells were so constructed and placed that pollution was unavoidable. If it is not possible to have a house connected with the city mains, at least the well should be placed as far as possible from the privy and guarded from pollution by using a cemented wall, a watertight cover, and this sloping toward, not from the privy.

The large number of residences in Springfield not connected with the common sewer constitutes a menace to the health of the citizens, and prompt measures should be taken to correct this insanitary condition. The common sewer is one of the necessities of communal life. Where the sewer is not laid in the street, the people should be instructed in the construction and maintenance of sanitary privies. Not one of the privies at the homes of patients in Springfield was sanitary, meaning by this a privy easily cleaned, one that does not contaminate the soil, and that is inaccessible to flies and domestic animals. The law is very clear on the question of sewage disposal.

Section 1, Title 18, of Part IV of the Ohio Building Code, provides "that privy vaults may be constructed only on premises where water and sewers are not accessible."

Section 2, prohibits privy vaults where a sewerage system is available, and provides for the cleaning and filling of vaults now in use.

Section 3, provides that no vault or other reservoir which is used as a privy or receptacle for human or animal excreta shall be located within two feet of any lot or alley line, or twenty feet of any street line or building, or fifty feet of any cistern, well, spring, whether they be located on the same or an adjoining lot or premises.

Other titles and sections provide for the proper construction of out-houses, the cleaning of privies and their general sanitary condition.

The extension of the common sanitary sewer to all unsewered districts, coupled with the extension of the water mains to all such localities, whereby the use of the common sewer is made practicable, are necessities at the present time. Such a step has been fruitful of splendid results elsewhere in the past, and its importance to Springfield cannot be overestimated.

Although no cases of typhoid fever were directly traceable to milk this year, the experience of other cities is, that if a sufficiently long period is considered, it will be found that a number of cases of typhoid fever arise, or are spread, by this means. Sanitary regulations should be enforced systematically and should have in view the proper care of the milk from the time it leaves the (healthy) cow until it is delivered to the consumer.

Bacteriological standards of purity have been found most efficacious and are as practical as any that can be carried out, if in addition, careful inspection and regulation of the premises of the supply houses and distributing dairies be effected. Such standards should never supplant this inspection and regulation, and are only efficient when combined therewith. In this connection ice cream and other forms of frozen milk and cream should undergo the same rigid regulation as the milk, as many bacilli, notably the *Bacillus typhosus*, can survive freezing temperature for a long period.

Raw Food. The protection of raw food from infection is effected by indirect methods. They consist in:

- (1) Proper disinfection in all cases of typhoid fever.
- (2) A pure water supply so that the medium in which such food is washed will not contaminate it.
- (3) Their proper screening when exposed for sale. This prevents the access of flies bearing infected matter.

The question of flies is an important one, as these have been responsible for many cases of typhoid fever elsewhere. As the investigation was made in November, when flies have largely disappeared, it was not possible to judge what part flies had played in distributing infected ma-

terial in Springfield this summer. An enormous reduction in the number of flies can be accomplished by abolishing privies or rendering them fly-proof; proper disposal of garbage, which includes the use of fly-proof receptacles in which the garbage is placed pending collection; and proper screening of windows; in a word, measures to deprive flies of their natural food material.

Briefly stated, those measures necessary to rid Springfield of typhoid fever are identical with those needed to improve the general sanitary condition of that city, with special methods of prevention while any cases of the disease are still present. Knowing this, it is not necessary to point out that the measures suggested here only touch on the border line of some of the most important points of prevention; there is a wealth of detail to investigate, necessitating a sufficient and efficient health department. The efficiency of the health department in the past has been hampered by lack of men and funds. One health officer cannot hope to cope successfully with one-tenth of the labor here outlined. Systematic and correlated efforts of council, a health department including food and milk inspectors, and physicians are necessary.

These, inspired by the help and sympathy of citizens can unite in a campaign to exterminate typhoid fever and incidentally accomplish a marked improvement in the sanitary conditions of Springfield.

SCARLET FEVER AT GEORGESVILLE.

At the request of Mr. E. B. Myers, the epidemiologist, visited Georgesville on December 16th, 1911, to investigate the scarlet fever situation. The report follows:

Georgesville consist of a small settlement of people about thirteen miles west of Columbus. There is a school having in attendance about 35 children. There is no physician stationed at Georgesville, nor is there a member of the board of trustees or a health officer.

Several weeks ago scarlet fever broke out in a family in a very light form, so light that one physician declared he could see no evidence of it; but another physician who saw the patient at a more favorable time declared it to be scarlet fever. Quarantine had been established by the township trustees, but on the declaration of the first physician that there was no evidence of the disease it was removed and so after a period of only four days' quarantine the children were allowed to mingle with others. The eldest boy of the Ferguson family had had practically none of the symptoms of the disease save desquamation, but two other cases, one in a family living outside of Georgesville, and another in Georgesville, were attributed to his presence in the houses.

At the time of the investigation there was no evidence of scarlet fever in the Ferguson family, but the history of desquamation, and the

fact that the younger brother had had an eruption and a sore throat, coupled with the history of infecting others, was considered sufficient to establish the diagnosis. The younger brother has at the present a discharge from the nostrils and an eczematous condition of the alae nasi which were present before he showed any symptoms of scarlet fever. This does not establish the innocence of the discharge, for it is well known that such a discharge may become infective during an attack of the mildest scarlet fever and remain so for some time after the attack is over. This being the case, the family was advised that all save the father should remain in quarantine until the health officer considered the situation safe and disinfected the house. The father was instructed to remain away from his children as much as possible, not to mingle with any other adults more than was absolutely necessary for the purpose of his work, and not under any circumstances to mingle with other children.

The Vaughn family have also a case of scarlet fever, now desquamating, but the quarantine is maintained, and there has been no dispute concerning the diagnosis.

The children who attend school have not been exposed, as far as could be ascertained, for a period of ten days, and this being the case no further outbreak need now be feared, since the longest period of incubation is usually not more than six days and usually less.

The following recommendations were made:

That the health officer of the township be instructed to maintain the quarantine of the Ferguson family until the time required by law has elapsed.

That provision be made by the township trustees to provide the Ferguson family with all necessities, including food and medical attendance as required by law.

That thorough disinfection be practiced in those houses in which there have been cases of scarlet fever, the house in which the Fergusons live, that in which the eldest boy was accustomed to remain with his grandmother, and that in which the Vaughn family live.

NOTE — No further difficulty was experienced.

SMALLPOX IN PLEASANT TOWNSHIP, MARION COUNTY.

On December 26th, 1911, at the request of Dr. Wiant, the epidemiologist visited Pleasant Township, Marion County, to investigate an outbreak of smallpox. His report follows.

The alleged case of smallpox lived about four miles from Marion. The history was that the young man had been at an entertainment two days previous to the investigation, that he had at that time an eruption

upon his forehead, and that his duty as one of the committee on entertainment forced him to expose a large number of persons.

The patient, a young man of thirty, had an eruption which, while discrete for the most part, covered his face and forehead, and was scattered more sparsely upon his body and limbs, the palms of his hands not being spared. The eruption was pustular, and involved the deeper layers of the skin. This, together with a history of the classic symptoms of onset four days previous to the determination of the eruption, placed the diagnosis beyond doubt. It was a typical case of discrete smallpox. The young man's father thereupon stated that he had suffered with the same disease two weeks previously. On examination he showed the characteristic "scabs." The only other occupant of the house, the boy's mother, had smallpox a number of years before.

The township board of health was instructed as to the care of contacts, and promised to isolate and quarantine all exposures. They were told what constituted an exposure and recommended to vaccinate all exposures if possible.

NOTE—Further information testified to the efficacy of these methods and the efficient manner in which they were carried out.

ACUTE ANTERIOR POLIOMYELITIS AT CLEVELAND.

On December 29th, 1911, the epidemiologist visited Cleveland to investigate the methods used by the local board of health to suppress the epidemic of infantile paralysis. His report follows.

Infantile paralysis was first reported to the health officer on January 4th, 1911. Only a few sporadic cases occurred before September, but on the 19th of that month five cases developed and from that time the disease assumed epidemic proportions. In all forty-nine cases were reported. There were thirteen deaths, a mortality of 26.5 per cent. Over 72 per cent. of the cases were under five years of age.

The measures adopted by the Cleveland board of health were as follows:

- (1) Report of all cases as soon as a diagnosis was established.
- (2) Isolation of the patients and those exposed to the disease for a period of three weeks.
- (3) Placarding of houses where the disease was present.

Among the interesting facts noted by the secretary of the board of health was the presence of twelve cases in a little settlement of Italians known as "Little Italy." Furthermore, these cases occurred almost simultaneously. This number of cases in one neighborhood was unduly large. These people were almost all hucksters and kept animals on or near the premises.

No systematic epidemiological investigation of the cases was made by the local board of health.

The disease appeared to abate considerably in December and very few cases have been reported since.

PREVALENCE OF SCARLET FEVER AT GREENWICH.

On December 30th, 1911, the epidemiologist visited Greenwich, to study the measures enforced by the local board of health for the prevention of scarlet fever, which had been prevalent there for sometime. The report follows.

The village of Greenwich is situated in Huron County, and has a population of 876. The health officer, Mr. John H. Baker, stated that sixteen cases of scarlet fever had been reported to him since July, 1911. All of these he had isolated and quarantined as required by law, and practiced terminal fumigation when the cases were reported by the physicians in attendance to be convalescent. The usual period of quarantine was then continued. It appears, therefore, that in those cases which were reported to the health officer, the usual precautions were taken. It was reported by the physicians, however, of whom there are four, that when the disease first appeared the symptoms were so light and evanescent that the diagnosis was not made until the disease had made considerable headway, and in such cases the usual precautions were not taken.

It was also stated that a number of families having the disease had not called in physicians, and the cases were, therefore, not reported to the health officer for some time.

At the time of the investigation there were four cases in the village, and two suspected cases in an adjacent township. This was the largest number of cases that there had been at any one time since the advent of the disease. During December the school was closed for two weeks, because of a large number of exposures among the school children. The disease appeared to diminish during this period, but on the reopening of school more cases appeared.

SUMMARY.

The prevalence of scarlet fever in Greenwich was due to the fact that the first cases were not immediately recognized as such, and consequently the necessary precautions were not taken until a considerable number of exposures had been allowed; also to the fact that later when the disease was recognized some cases did not call physicians until many persons had been exposed.

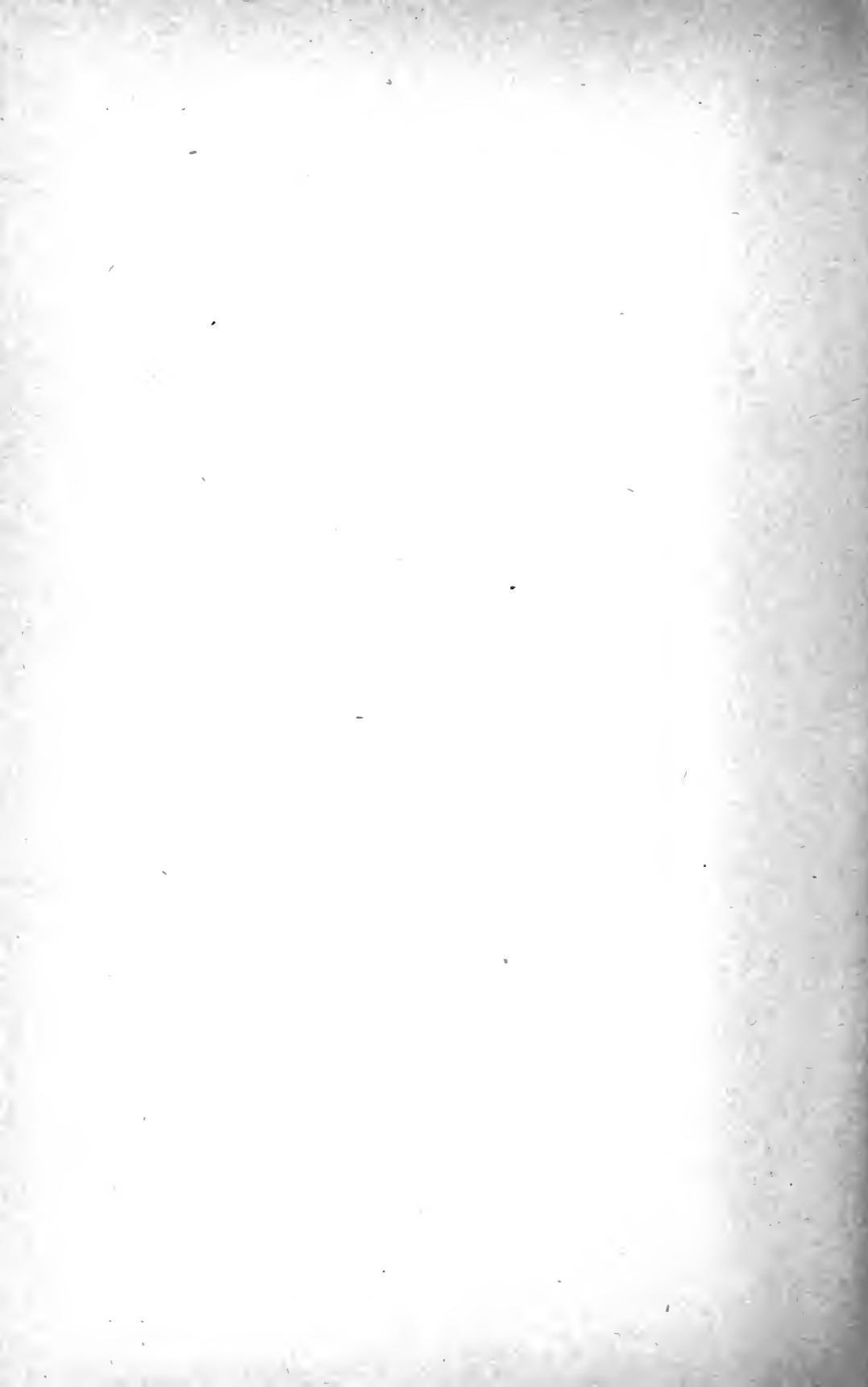
At the present time there is no cause for alarm, since the local health authorities have the situation well in hand. Instructions as to the

rules and regulations of the State Board of Health and the laws of Ohio governing the control of contagious diseases were given the local health authorities, and the health officer of the township in which the two suspected cases were located.

There are no further measures necessary to control scarlet fever in Greenwich.

Respectfully submitted,

FRANK G. BOUDREAU, M. D.,
Epidemiologist.



REPORT OF THE HYGIENIC LABORATORIES

For the Year Ending December 31st, 1911.

(479)

REPORT OF LABORATORIES

I have the honor to present the following report for the year ending December 31, 1911.

CHANGES IN STAFF.

During the ensuing year the resignations of Mr. A. J. Slack, chemist, Mr. L. V. Parker, bacteriologist, and Mr. J. P. Van Wirt, assistant chemist, were received. Miss Martha Koehne was employed as chemist, and Mr. R. T. Kennedy as assistant chemist. Dr. F. G. Boudreau, epidemiologist, has been of much assistance in the diagnostic laboratory, he having spent such time in the laboratory as was not required in the epidemiological work.

WORK OF THE LABORATORIES.

The number employed on the laboratory staff was less than for the two years previous, and this fact together with the increase in the amount of routine work has prevented the taking up of any great amount of new work. There has been a hearty cooperation of the entire staff and a conscientious effort to handle all work promptly and satisfactorily, and that the rate of increase in specimens received is higher each month, is a testimonial to the character of the results sent out.

Some extra work was done during the year in comparative examinations of diphtheria on direct smears made at the bedside, and in the laboratory, with a view to making improvements in our present outfit to overcome errors arising from delays in transit of specimens. Data is still being collected along this line.

Comparative results on sputum examinations have been and are being conducted with a view to determining the best procedure for routine examinations for tubercle bacilli in those specimens which are negative by the ordinary methods.

Late in the year a movement was started to greatly increase the number of distributors of laboratory outfits and to extend the facilities of the laboratories to practically every physician. The bulletin concerning the laboratories was revised and this together with other information is being distributed among physicians who have made little or no use of the laboratory facilities. The coming year will undoubtedly see a greater increase in the number of specimens submitted and assistance furnished by the laboratories.

The total number of examinations during the year was 5,368, an increase over the total for 1910 of 703, and these examinations were as follows:

Bacterial diagnoses (including rabies).....	3,927
Sanitary water analyses.....	1,086

Sewage and trade wastes.....	90
Miscellaneous examinations	265
Total	5,368

The total increase over the work for the preceding year is 703, or about 15%.

	Diphtheria.	Tuberculosis.	Typhoid.	Malaria.	Rabies.	Miscellaneous.	Water.	Sewage.	Total.
January	45	217	46	0	3	13	41	0	365
February	34	198	38	2	4	0	45	0	321
March	34	242	32	1	6	0	55	0	370
April	24	212	28	1	13	60	62	0	390
May	21	242	41	2	18	3	92	25	434
June	12	226	36	0	11	43	104	15	447
July	23	157	70	3	8	23	161	1	446
August	40	182	112	0	14	34	132	26	560
September	59	168	144	2	8	1	114	1	497
October	124	153	142	2	8	44	117	5	585
November	133	149	68	2	14	42	119	17	544
December	81	209	49	0	14	2	44	0	399
Total ...	630	2,355	806	15	121	265	1,086	90	5,368

DIPHTHERIA.

	Positive.	Negative.	Atypical.	Unsatisfactory.*	Total.
January	2	35	2	0	45
February	1	25	2	0	34
March	1	27	0	0	34
April	6	16	2	.....	24
May	4	15	2	.....	21
June	2	10	0	.....	12
July	2	11	1	2	23
August	8	23	3	6	40
September	28	27	3	1	59
October	68	49	7	0	124
November	54	66	13	0	133
December	38	38	4	1	81
Total	239	342	39	10	630

38% positive.

*Specimens were submitted in old form outfit which were in poor condition.

This work shows an increase of 77% over the work of 1910. Physicians generally are making more use of the laboratory in controlling this disease, and the increasing number of positive findings shows that diphtheria was very prevalent during the year. By the examination of cultures for release the outbreak of diphtheria at the Children's Home at Canal Dover was soon under control.

TUBERCULOSIS.

	Positive.	Negative.	Total.
January	51	166	217
February	52	146	198
March	68	174	242
April	48	164	212
May	57	185	242
June	77	149	226
July	52	105	157
August	72	110	182
September	67	101	168
October	44	109	153
November	52	97	149
December	64	145	209
Total	704	1,651	2,355

This work shows an increase of 21% over that of 1910, while the percent positive findings has decreased from 31% to 30%.

TYPHOID.

	Positive.	Negative.	Atypical.	Unsatisfactory.*	Total.
January	25	19	2	0	46
February	13	22	3	0	38
March	10	19	3	0	32
April	6	17	5	0	28
May	21	13	5	2	41
June	10	21	5	0	36
July	22	38	9	2	70
August	40	50	22	2	112
September	78	55	9	2	144
October	71	56	15	0	142
November	31	33	4	0	68
December	17	32	0	0	49
Total	344	375	82	5	806

42% positive. *Insufficient blood.

Although the number of typhoid specimens was greater during the past year than during 1910, the number of positives was greatly decreased, showing only 42%. The most serious epidemic during the year occurred at Newark, and the large number of Widal's submitted was undoubtedly of very great assistance in controlling the epidemic.

RABIES.

	Positive.	Negative.	Suspended.	Unsatisfactory.*	Total.
January	1	2	0	0	3
February	4	0	0	0	4
March	3	3	0	0	6
April	8	4	1	0	13
May	10	6	0	2	18
June	10	0	1	0	11
July	4	3	0	1	8
August	7	4	1	2	14
September	7	1	0	0	8
October	5	3	0	0	8
November	9	5	0	0	14
December	10	4	0	0	14
Total	78	35	3	5	121

64.5% positive. *Received in poor condition.

The total number of specimens submitted was fifteen less than during 1910, but the percentage positives is about the same. Only one severe epidemic occurred during the year and this was at Akron. About thirty-five positive cases of rabies were reported in this city and almost that number of people were given the Pasteur treatment.

MALARIA.

	Positive.	Negative.	Total.
January	0	0	0
February	0	2	2
March	0	0	1
April	0	1	1
May	0	2	2
June	0	0	0
July	0	3	3
August	0	0	0
September	1	1	2
October	0	2	2
November	0	2	2
December	0	0	0
Total	1	14	15

MISCELLANEOUS.

January	13	August	34
February	0	September	1
March	0	October	44
April	60	November	42
May	3	December	2
June	43		
July	23	Total	265

The above table includes all special examinations as follows:

- 1 milk for ptomaine.
- 3 cheese for ptomaine.
- 1 bologna for ptomaine.
- 1 meat for poison.
- 83 water for B. Coli.
- 63 water for count.
- 56 water for count and B. Coli.
- 29 water for dissolved oxygen.
- 3 water for putrescibility.
- 4 sewage.
- 1 worm for identification.
- 1 organism in spring water.
- 1 organism in well water.
- 1 specimen suspected anthrax.
- 2 specimens suspected gonorrhoea.
- 3 specimens feces for tuberculosis.
- 4 specimens urine for tuberculosis.
- 4 specimens pus for tuberculosis.
- 4 specimens feces for typhoid fever.

WATER ANALYSES.

MONTHLY EXAMINATIONS CLASSIFIED.

	Prop. Public Sup.	Present Supply.	Private Supplies.	Columbus Tap.	Total.
January	3	13	18	7	41
February	10	9	13	13	45
March	9	4	28	14	55
April	11	29	12	10	62
May	13	32	21	26	92
June	9	44	33	18	104
July	15	102	24	20	161
August	17	42	57	16	132
September	3	32	60	19	114
October	6	35	64	12	117
November	4	46	56	13	119
December	1	2	28	13	44
Total	101	390	414	181	1,086

SEWAGE AND TRADE WASTES.

January	0	August	26
February	0	September	1
March	0	October	5
April	0	November	17
May	25	December	0
June	15		
July	1	Total	90

WATER ANALYSES ON SAMPLES FROM PRIVATE SOURCES.

CAUSE FOR EXAMINATION.

	Typhoid.	Quality.	Total.
January	15	3	18
February	8	5	13
March	21	7	28
April	8	4	12
May	16	5	21
June	19	14	33
July	15	9	24
August	42	15	57
September	48	12	60
October	46	18	64
November	33	23	56
December	21	7	28
Total	292	122	414

Respectfully submitted,

FRED BERRY,
Bacteriologist.

To the Secretary of the Ohio State Board of Health,
Columbus, Ohio.

REPORT OF THE STATE INSPECTOR OF PLUMBING.

Pursuant to the provisions of an act to create the office of State Inspector of Plumbing, define the duties of the office, fix the compensation of the incumbent thereof, and fixing a penalty for the violation of any of the provisions of this act," passed May 10, 1910, the State Board of Health on January 25, 1911, appointed the undersigned to take up the duties of the office February 15, 1911.

I assumed the duties of the office with a general idea and knowledge of its requirements and responsibilities, and with the understanding that my first duty was the impartial enforcement of all laws governing the department.

The department was created and laws enacted in order that the state might take official cognizance of the unfavorable sanitary conditions of plumbing throughout the commonwealth, often very dangerous to life and most injurious to health.

The work of the department will be better appreciated after a careful study of the reports on the institutions already inspected, in which changes were recommended for the betterment of the sanitary conditions.

As the work progresses and the full intent of the law is made more manifest, and with the co-operation of the architects, sanitary engineers, superintendents of institutions, local plumbing inspectors, boards of health and plumbers, it is our hope that we can interest all good citizens in the sanitary construction of plumbing in its relation to health and economy.

The following is the act creating the department:

AN ACT

To create the office of State Inspector of Plumbing, defining the duties of the office, fixing the compensation of the incumbent thereof, and fixing a penalty for the violation of any of the provisions of this act.

Be it enacted by the General Assembly of the State of Ohio:

Section 1. There shall be, and is hereby, established and created in this state the office of state inspector of plumbing, under the direction and supervision of the state board of health.

Section 2. It shall be the duty of the state board of health, within ninety days after the passage and approval of this act, to appoint an elector of this state to fill the office of state inspector of plumbing, and to hold office until such time as his successor may be appointed and qualified. The person so appointed must be a person with at least ten

years' experience. The state board of health shall have the power to make and enforce rules and regulations governing plumbing to carry out the provisions of this act.

Section 3. It shall be the duty of said inspector of plumbing, as often as instructed by the state board of health, to inspect any and all public or private institutions, sanitariums, hospitals, schools, prisons, factories, workshops, or places where men, women or children are or might be employed, and to condemn any and all unsanitary or defective plumbing that may be found in connection therewith, and to order such changes in the method of construction of the drainage and ventilation, as well as the arrangement of the plumbing appliances, as may be necessary to insure the safety of the public health.

Such inspector shall not exercise any authority in municipalities or other political subdivisions wherein ordinances or resolutions have been adopted by the proper authorities regulating plumbing or prescribing the character thereof.

Section 4. He shall hold himself in readiness at any and all times to go to any part of the state if so directed by the state board of health, for the purpose of making a sanitary inspection of any building or other place that they have reason to believe is in such a condition as to be a menace to the public health.

Section 5. When any building is found to be in a sanitary condition, or when changes which are ordered in the plumbing, drainage or ventilation have been made, and after a thorough inspection, on approval by said inspector of plumbing he shall issue a certificate signed by himself and countersigned by the state board of health, which must be posted in a conspicuous place for the benefit of the public at large. Upon notification by said inspector, said certificate shall be revoked for any violation of this act.

Section 6. For each inspection and certificate so issued, except on inspections of state buildings or structures, he shall charge a fee of five dollars, such fee to be turned into the state treasury. If upon first inspection such work is found in sanitary condition, no charge is to be made for such inspection and certificate.

Section 7. Within ten days after his appointment the said inspector shall give a bond, payable to the state of Ohio, for the faithful performance of his duties, in the sum of five thousand dollars. Said bond, when approved by the attorney general shall be deposited with the auditor of state.

Section 8. The inspector so appointed shall not, during his term of office, be engaged or interested in the plumbing business or the sale of any plumbing supplies, nor shall he act as agent, directly or indirectly, for any person or persons so engaged.

Section 9. He shall receive for his services a salary of eighteen hundred dollars per annum, payable monthly, and all necessary expenses.

Section 10. He shall have the power between sunrise and sunset to enter any public building where he has good and sufficient reason to believe that the sanitary condition of such premises is such as to endanger the public health, for the purpose of making such inspection as may be necessary to ascertain the condition of the same.

Section 11. He shall report promptly to the state board of health the condition of all premises inspected by him; also the number of inspections and changes ordered, as well as any other information with his office, that they may require.

Section 12. He shall be provided with a suitable office in the city of Columbus, as well as with all necessary apparatus for making tests, and such stationery as the business of his office may require.

Section 13. It shall be the duty of any owner, agent or manager, or any public building where an inspection is ordered by said inspector of plumbing, to cause or have the entire system of drainage and ventilation repaired, as he may direct. After due notice to repair such work, it shall be the duty of said owner, agent or manager to notify said inspector of plumbing that such work is ready for his inspection. Failing to have work ready for inspection at specified time of such notice, he will be subject to such penalty as hereinafter provided.

Section 14. Any person or persons, owner, agent or manager refusing, failing or neglecting to comply with any of the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be subject to a fine of not less than ten nor more than one hundred dollars, or imprisoned for not less than ten nor more than ninety days or both; but no person shall be imprisoned under this section for the first offense, and the prosecution shall always be as and for a first offense, unless the affidavit upon which the prosecution is instituted contains the allegation that the offense is a second or repeated offense.

Section 15. It shall be the duty of said inspector of plumbing upon receipt of the knowledge that any part of this act has been violated, to go before any justice of the peace and cause the arrest and prosecution of all persons whom he has reason to believe are guilty of such violation.

Section 16. All acts and parts of acts in conflict herewith are hereby repealed.

GRANVILLE W. MOONEY,
Speaker of the House of Representatives.

FRANCIS W. TREADWAY,
President of the Senate.

Passed May 10, 1910.

ORGANIZATION.

The absence of an appropriation for offices, office equipment and stenographer's services handicapped the organization of the department. The language used in the appropriation allowed by the General Assembly made it impossible to use this fund for any other purpose than traveling expenses. The department labored under additional disadvantage in the absence of clerical assistance, which made it necessary that the state inspector of plumbing take care of the correspondence of the office in person. This was relieved on December 1, 1911, by the appointment of a stenographer.

Through the courtesy of the State Board of Health, and to the inconvenience of the Hygienic Laboratories, the department was furnished with office room and equipment on the top floor of the State House Annex.

With no precedent established, considerable time was consumed in drafting blanks for records of inspection, receipts, applications for inspection, certificates of approval, pay-in orders and monthly reports, and arranging for the method of keeping the records of inspections made, orders issued, fees collected and certificates of approval issued, which would be systematic, accurate and meet with the approval of the state auditor's office.

OHIO STATE BUILDING CODE.

Pursuant to the provisions of an act entitled "An act relating to the preparation of a code or regulations to govern the erection and maintenance of public and other buildings." The Ohio State Building Code Commission organized as follows:

Mr. T. P. Kearns, Chairman, State Inspector of Workshops and Factories.

Mr. William Zuber, Secretary, State Fire Marshal.

Dr. C. O. Probst, Secretary of Ohio State Board of Health, and appointed Mr. Fred Elliott consulting architect to the Building Code Commission.

The Act is as follows:

WHEREAS, The state departments of workshops and factories, state fire marshal and state board of health have met with opposition and embarrassment in the performance of the duties pertaining to those departments with respect to the construction, safety and sanitary conditions of public and other buildings, and

WHEREAS, Such opposition and embarrassment have arisen because of inadequate statutory provisions relative to those subjects, and

WHEREAS, Great loss of life, health and property have resulted because of the lack of proper statutory building regulations, now therefore,

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That the secretary of the state board of health, state fire marshal and chief inspector of workshops and factories be, and they are hereby empowered and required, acting conjointly, to cause to be prepared and submitted at the next session of the general assembly a code of regulations with respect to the construction, safety, sanitary conditions and maintenance of public and other buidings, and to that end may employ such assistants as they deem necessary; provided, however, that the total expense incurred in the employment of such assistants shall not exceed the sum of two thousand five hundred dollars.

GRANVILLE W. MOONEY,
Speaker of the House of Representatives.

FRANCIS W. TREADWAY,
President of the Senate.

Passed May 10, 1910.

Approved May 13, 1910.

JUDSON HARMON, *Governor.*"

OHIO STATE BUILDING CODE.

Part Four—Sanitation.

One of the first duties assigned to the state inspector of plumbing was to review the code to govern the construction, installation and inspection of plumbing and drainage, drafted by the Ohio State Building Code Commission as a part of the Ohio State Building Code, and a partial report of this Commission to the 79th General Assembly.

The provisions of Part Four provided additional duties for the State Board of Health to administer, outside of the jurisdiction of building inspectors or commissioners, or health departments of municipalities having building or health departments, in the enforcement of all the provisions of this law in relation and pertaining to sanitary plumbing.

In order to take advantage of and profit by the experience of those whose duties it would become to enforce the provisions of this act, various conferences were held, at which building inspectors, master plumbers, architects, plumbing inspectors and journeyman plumbers were heard, whose advice and recommendations were given careful consideration, and proved to be of great value in drafting the plumbing code.

After all questions at issue had been given consideration, the building code commission placed the matter of revision in the hands of the consulting architect of the Building Code Commission and the state inspector of plumbing, in order that the code might be re-written and placed before the legislature in connection with the State Building Code.

The Ohio State Building Code passed the legislature May 31, 1911, was approved by the governor June 14th, 1911, and became effective August 15, 1911.

Part Four, Sanitation, was drawn to cover all buildings, but the administrative sections, which were drawn in the attorney general's office, did not properly cover this matter, and the attorney general has given an opinion that Part Four does not cover "residences." This error is causing considerable confusion, making it necessary for cities to enforce two plumbing codes, which in most cases are in direct conflict and defeat the direct principle and object of this law, which was to create "a minimum standard, universal, state plumbing code for all buildings."

The state plumbing code has precedence over the city plumbing codes, and in order to refrain from the enforcement of one code for residences and another for all other buildings, it would be necessary for a city council to adopt the state code by ordinance, thus requiring the expenditure of a considerable sum of money in advertisement.

This condition of affairs made it necessary for the department to request the attorney general to advise or suggest some feasible plan which would relieve the present situation. This opinion has not yet been given.

DISTRIBUTION OF LAWS.

In order that those whose duty it became to enforce the state law might have the opportunity of familiarizing themselves with its many provisions, the department requested the state supervisor of printing to have 10,000 copies printed. The state supervisor of printing held the matter in abeyance until such time as he received an opinion from the attorney general relative to the legality of printing the codes in book form.

This matter was finally adjusted, and we received the codes November 15, 1911, and have distributed 6,000 copies to the architects, health officers, plumbing inspectors, master and journeyman plumbers, county commissioners, superintendents of state institutions and children's homes throughout the state.

The department has occupied the position of an information bureau, and is daily receiving letters from all over the state, requesting information and interpretations pertaining to the provisions of the code. This made it necessary for the inspector to remain at his office, and consumed considerable time which could otherwise have been spent in making inspections.

INSPECTIONS OF STATE AND COUNTY INSTITUTIONS.

Following is a brief description of the institutions inspected, their location, means of sewage disposal, conditions that existed and changes recommended:

CLARK COUNTY INFIRMARY.

This institution is located in the city of Springfield, on Northern Avenue.

The plumbing consists of: 15 water closets, 4 plain sinks, 2 urinals, 9 lavatories, 7 bath tubs, making a total of 37 plumbing fixtures, distributed over various parts of the building.

The house drain consists of standard cast iron pipe, and the sewage discharges into Buck Creek.

Existing Conditions.

The sanitary condition of the plumbing could be improved.

Traps are not ventilated nor protected from siphonage. In some instances they are set two feet below the floor, thereby creating a fouling leg of four or more feet.

A closet in the main building on the first floor leaks around the floor connection.

The bathtub in the helpless ward is without running water.

The closet in colored women's ward is without partition to separate it from the sleeping quarters.

Recommendations.

That the authorities in charge be requested to connect the bathtub in the helpless ward with running water.

Partition the water closet in the colored women's ward from the sleeping room.

The age of the buildings of this institution would not warrant extensive changes in the plumbing, for the work in general will outlive the buildings, but the above repairs should be made.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and later informed the Board that these changes had been made.

CLARK COUNTY CHILDREN'S HOME.

This institution is located two miles north of Springfield, on the Children's Home Road.

The plumbing consists of: 9 water closets, 3 slop sinks, 4 plain sinks, 4 urinal troughs, 6 lavatories, 7 bath tubs and one 4 part laundry tray, making a total of 37 plumbing fixtures.

The house drain is standard cast iron and stone, and the sewage discharges into a ditch leading to Buck Creek.

Existing Conditions.

The toilet rooms were found neat, and in all cases provided with light and ventilation, and with the exception that the fixture traps in most cases are not ventilated or protected from siphonage, the plumbing and sanitation of this institution is fair. No changes were recommended.

MONTGOMERY COUNTY INFIRMARY.

This institution is located two miles west of Dayton, on the Infirmary Home Road.

The plumbing consists of: 43 water closets, 1 slop sink, 5 plain sinks, 2 urinals, 3 trough urinals, 9 floor drains, 29 lavatories, 17 bathtubs, 1 shower bath, one 7 part laundry tray, making a total of 117 plumbing fixtures.

The house drain is of iron, and discharges the sewage onto filter beds and the effluent to a county ditch.

Existing Conditions.

The plumbing in the new building is good. In the old building it is fair, but in the laundry building and old hospital it is very bad. The last two buildings have been condemned, and will be razed as soon as the necessary funds can be provided.

Grease trap under kitchen sink in new building has been removed, and temporary connections have been made without trapping.

Trap and connections to sink in the main kitchen are broken, allowing the sewer air to pass from cesspool to the kitchen.

Water closets in old wing of the building are very foul.

Recommendations.

That the authorities in charge be requested to have the new grease trap under the kitchen sink re-installed as soon as possible.

Replace the damaged connections under the sink in main kitchen with either a grease trap, or discharge the same into a special catch basin in the yard, with man-hole and cast iron ring and cover for cleaning purposes.

Trap the floor drain in the main kitchen.

Disinfect and clean the lime and corrosion from the closets in the old building.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and a communication from the steward was received informing the Board that the recommendations had been complied with.

DAYTON STATE HOSPITAL.

This institution is located just south of Dayton, on Wayne Avenue.

The hospital is divided into 26 wards; male and female dining rooms; administration building; laundry; carpenter and paint shop and machine and boiler house.

The plumbing consists of: 130 water closets, 35 slop sinks, 32 plain sinks, 28 floor drains, 137 lavatories, 39 bath tubs, 7 shower baths, 3 drinking fountains, one 6 part laundry tray, making a total of 417 plumbing fixtures.

The house drain consists of standard and extra heavy cast iron pipe. The sewage discharges into a cesspool overflowing into a ditch, which empties into the Miami & Erie Canal.

Existing Conditions.

The toilet rooms are clean, and the plumbing fixtures free from corrosion.

The soil pipe in many places has been tapped for clean-out purposes, and then plugged with wooden plugs.

Wrought iron pipe is used for drainage, with square fittings.

Lead joints in soil pipe are faulty in several places.

The main ice box is connected directly to the sewer.

Kitchen sink in ward 15 has no trap.

Re-vents from wash stands in guest rooms are connected with the local vent pipe from the water closets, permitting the discharge of sewer air into these rooms.

Drinking fountain in female dining room has no water supply.

Re-vent from lavatory on the fourth floor is connected with tin pipe.

Recommendations.

That the authorities in charge be requested to make the following changes:

Disconnect the drains from the general ice box and run to an open sink.

Repair the soil pipe joint in employes' bath room.

Re-vents to wash stands in guest rooms should be disconnected from the local vent pipes supplying water closets.

Vent pipes should be installed with galvanized wrought iron in the place of tin pipe.

Remove all wooden plugs, tap the pipe and insert iron plugs.

Supply drinking fountain in female dining room with water connection; or disconnect the same and plug the opening.

Discontinue using square fittings for drainage purposes.

Place trap under kitchen sink in ward 15.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that many of the changes had been made and others would be completed in the near future.

PREBLE COUNTY INFIRMARY.

This institution is located one and one-half miles north of Eaton, on the New Paris Road.

The plumbing consists of: 16 water closets, 3 plain sinks, 2 floor drains, two 6 part range closets, 8 lavatories and 5 bath tubs, making a total of 46 plumbing fixtures.

The house drain is standard cast iron connected to a cesspool, which overflows into Seven Mile Creek.

Existing Conditions.

The sanitary condition of the plumbing is poor.

The jail house contains a 6-part range closet on each floor, with one hopper in each cell. These hoppers are connected with a 4-inch iron pipe run horizontally, and connected with the sewer by means of one trap at the bottom of the line. This stack is not carried through the roof. These closets are not provided with any flushing device, but the soil pipe is flushed once in every 24 hours by means of an angle valve on the end of the line. This building, in which insane patients were formerly confined, has been converted into the female ward.

In the men's ward the water closets are connected directly with the water supply, and can only be flushed from the halls.

The toilet room in the old men's department on the second floor is directly connected with the sleeping room. Tin pipe is used instead of cast iron for this closet vent.

The bath room of the old women's ward is located in the main sleeping room, divided by a six foot partition, without window or any means of ventilation except that which finds its way through the sleeping room.

The kitchen sink in men's dining room is not trapped.

Recommendations.

That the authorities in charge be requested to either abandon the jail house or discontinue the use of the range system, which by all means should be removed.

Continue partition to the ceiling and place window in women's toilet room.

Continue the partition to the ceiling and place window in old men's toilet room.

Remove the tin pipe and replace with cast iron in old men's toilet room on the second floor.

A more complete system of flushing water closets in men's ward should be installed.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified and later informed the Board that the changes had been made; but upon further inquiry it was learned that another visit by the state inspector was necessary, to secure a more thorough understanding of the suggestions made.

PREBLE COUNTY CHILDREN'S HOME.

This institution is located one mile south of Eaton, on the Brookville Pike.

The plumbing is composed of: 9 water closets, 1 slop sink, 5 plain

sinks, 1 urinal, 1 floor drain, 6 lavatories and 4 bath tubs, making a total of 27 plumbing fixtures.

The house drain is standard cast iron, and the sewage discharges into a ditch which empties into Seven Mile Creek.

Existing Conditions .

The sanitary condition of the plumbing in this institution is good. The toilet rooms and fixtures are kept neat and clean.

The vent pipe from the lavatory trap in the girls' bath room is disconnected, permitting sewer air to pass into the room.

The kitchen sink is without a trap.

Recommendations.

That the authorities in charge be requested to re-connect the vent pipe to the lavatory trap in the girls' bath room.

Place trap under kitchen sink.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified and later informed the Board that the changes had been made.

BUTLER COUNTY INFIRMARY.

This institution is located just east of Hamilton on the Princeton Pike.

The plumbing is composed of: 13 water closets, 7 plain sinks, 2 urinals, 2 floor drains, 9 lavatories and 8 bath tubs, making a total of 41 plumbing fixtures.

The house drain is standard cast iron, and the sewage discharges into a sink hole in the Butler County fairground gravel pit.

Existing Conditions.

The sanitary condition of the plumbing in this institution is poor.

The ice box in the milk room is connected directly to the sewer without trap.

The main ice box is connected to the sewer.

There is no trap under kitchen sink, sink in bake-shop or wash-stands in wash room on first floor.

The tin wash-trough in the men's wash room in the basement, adjoining the men's dining room, is in very bad condition. The odor from the same would make it appear as though this sink was used for urinal purposes.

The plumbing in the old stone house is partly removed.

Recommendations.

That the authorities in charge be requested to make the following changes:

The wastes from the main ice box, also from the ice box in the milk room, should be disconnected from the sewer and allowed to discharge into an open sink or floor drain which is properly trapped.

Install traps under wash-stands on first floor, kitchen sink and sink in bakery.

Remove the tin wash-trough in men's wash room, and replace with wash basin set high enough to prohibit its use for urinal purposes.

Remove the old plumbing in the old stone house and plug up the sewer opening.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes had been made.

BUTLER COUNTY CHILDREN'S HOME.

This institution is located on the corner of Garden and D streets, Hamilton.

The plumbing is composed of: 16 water closets, 1 slop sink, 2 plain sinks, 2 urinals, 2 urinal troughs, 9 floor drains, 16 lavatories, 7 bath tubs, 2 shower baths and 2 drinking fountains, making a total of 59 plumbing fixtures.

The house drain is standard cast iron and stone, and the sewage discharges into the city sewer system.

Existing Conditions.

The sanitary conditions in this institution are good.

The connection between the stone pipe at the foot of the soil pipe stack in the girls' toilet room is broken.

The ice box waste in the hospital cottage was formerly connected directly to the sewer. The ice box has been removed, and the sewer opening has never been capped.

Recommendations.

That the authorities in charge make the following changes:

That the connection between the stone pipe at the foot of the soil pipe stack be repaired, and

The ice box waste in the hospital cottage be removed and the opening capped.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes had been made.

MIAMI UNIVERSITY.

This institution is located at the corner of Spring and High streets, Oxford, Butler County.

The plumbing is composed of: 70 water closets, 6 slop sinks, 14 plain sinks, 9 urinals, 2 floor drains, 59 lavatories, 11 bath tubs, 15

shower baths, 1 drinking fountain and 38 special sinks in the lavatories, making a total of 225 plumbing fixtures, distributed throughout the various buildings.

Existing Conditions.

This college is composed of 9 buildings, known as the main building, the auditorium, Bryce Hall, Hepburn Hall, normal college building, library gymnasium, and north and south dormitories.

The plumbing work is in good condition, and with the exception of the work in the north and south dormitories, it is new. Funds have been appropriated to remodel the plumbing in the north and south dormitories.

The east wing of the main building has several sinks and ice box wastes which are temporary work, and will be removed just as soon as the new building now under construction is completed.

LONGVIEW HOSPITAL.

This institution is located on the Paddock Road east of Carthage.

The plumbing is composed of: 152 water closets, 50 slop sinks, 44 plain sinks, 11 floor drains, 124 lavatories, 49 bath tubs, 12 shower baths, 31 laundry trays, making a total of 473 plumbing fixtures.

Existing Conditions.

This hospital is divided into the administration building; 16 female wards; 9 male wards; male cottage; barn; store room; machine shop and the laundry.

The sanitary condition of the toilet rooms is good. The toilet rooms, floors, walls and fixtures are kept clean and have plenty of light and air.

The main sewer in the air duct is open in places and not in the best condition. The air and odor from this duct and sewer are carried to the top of the building, by means of a large ventilating stack, in the center of which is the boiler stack. This forms a mechanical circulation of air, and removes the possibility of sewer air and odors passing through the buildings.

In wards 4, 8 and 10 the soil pipe stacks are not carried through the roof.

In the female wards 9 and 10 and in male ward 10 the stack vents are continued through the roof with tin pipe.

Bath tub in male ward No. 6 is not trapped.

Recommendations.

That the authorities in charge be requested to remove wooden box used for water closet, which is set over the main sewer in the air duct.

Cover this portion of the main sewer.

Replace tin vent pipe with iron.

Install trap beneath the bath tub in male ward No. 6.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes had been made.

HAMILTON COUNTY INFIRMARY.

This institution is located at the corner of Carthage Avenue and Paddock Road, east of Carthage.

The plumbing is composed of: 31 water closets, 5 slop sinks, 4 plain sinks, 1 urinal, 2 urinal troughs, 2 floor drains, 30 lavatories, 14 bath tubs, 6 shower baths and 6 laundry trays, making a total of 101 plumbing fixtures.

The house drain is standard cast iron, and the sewage discharges into Milk Creek.

Existing Conditions.

The plumbing work in general is good, with the exception of the bath and toilet rooms on the men's side, which are in very poor condition.

The urinal trough in the men's toilet room is not trapped.

Recommendations.

That the authorities in charge be requested to overhaul water closets on the men's side, and place them in good working condition.

Install new bath tubs in men's bath rooms.

Install trap for urinal trough in men's department.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified and later informed the Board that the changes had been made.

O. S. & S. O. HOME.

This institution is located south of Xenia, in Greene County.

The plumbing is composed of: 58 water closets, 53 plain sinks, 5 urinals, 3 urinal troughs, 8 floor drains, 60 latrine closets in 5 buildings, 26 lavatories, 47 bath tubs, 2 shower baths and 2 laundry trays, making a total of 264 plumbing fixtures.

Existing Conditions.

This institution is composed of the administration building; new and old school house; industrial building; laundry; armory; hospital; boiler house; green house; stables; 3 boys' and 2 girls' general outside toilet rooms; 20 single and 6 double cottages.

The plumbing work in general, though very old, is fair. The bath rooms in the cottages are kept neat and clean.

The old iron sinks are gradually being replaced with white porcelain sinks.

The hospital ice box is connected directly with the sewer.

Traps beneath bath tub in ward A and beneath sinks in cottages 14 and 27 are in bad shape.

Water closet in cottage 29 is broken and ready to collapse.

Boys' toilet room in the rear of old school is in very bad shape.

The water closet in cottage 15 is without water.

Recommendations.

That the authorities in charge be requested to disconnect sewer from ice box in hospital.

Install new traps beneath bath tub in ward A; beneath sinks in cottages 14 and 27.

Replace water closet in cottage 29.

Repair water closet in cottage 15.

Install pipe support on flush pipe to water closet in cottage 25.

Remodel or abandon boys' toilet room in rear of old school.

Discontinue the use of ladies' bath room on the second floor of the administration building until the ceiling is repaired. The condition of this ceiling is dangerous to the occupants.

The State Board of Health approved the foregoing recommendations, the authorities in charge were notified, and later informed the Board that the changes had been made.

GREENE COUNTY INFIRMARY.

This institution is located on the Dayton & Xenia Pike west of Xenia.

The plumbing is composed of: 29 water closets, 8 plain sinks, 1 urinal, 12 floor drains, 10 lavatories, 7 bath tubs, making a total of 67 plumbing fixtures; also an 8-apartment privy vault.

The house drain is standard cast iron and stone, and the sewage discharges into a sewage disposal plant.

Existing Conditions.

The sanitary condition of the plumbing in the main building is poor.

Sinks in the wash room—first floor—female side—kitchen—vegetable room and the employes' wash room on the first floor are without traps.

The 4 inch stack from the superintendent's bath room is carried out through the roof with tin pipe.

The bath rooms in the asylum are in very bad condition.

The copper tub in the employes' bath room is not in use.

The privy vault in the rear of the asylum (known as the round house) is very foul.

There are no bath rooms in the male or female wards in the main building.

There are 18 water closets in the hospital, located in rooms occupied by patients.

Part of this system is old and part is new.

Recommendations.

That the authorities in charge be requested to trap all plumbing fixtures.

Remove old copper tub in employes' bath room.

Remove old bath tubs and plumbing from old asylum building.

Clean, fill and abandon privy vault.

Provide bath room for the male and female inmates in the main building.

Remove old parts of plumbing in hospital that are connected to the old sewer.

Replace tin pipe from the superintendent's bath room with iron pipe.

The placing of water closets in sleeping rooms, as in this hospital is a very bad practice, unless they are provided with a mechanical means of local ventilation.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, but have failed to reply to communications or to notify the Board that the suggestions have been complied with.

GREENE COUNTY CHILDREN'S HOME.

This institution is located on the Dayton & Xenia Pike, west of Xenia.

The plumbing consists of: 1 water closet, 3 sinks, 1 floor drain, 2 lavatories and 3 bath tubs, making a total of 10 plumbing fixtures; also 3 outside privy vaults.

The house drain is composed of standard cast iron and stone; and the sewage discharges into a ditch which empties into Shawnee Creek.

Existing Conditions.

This building is not fit for human habitation, and will only be occupied a short time. A new children's home is now being erected, and will be completed and ready for occupancy on or about December 1, 1911.

MADISON COUNTY INFIRMARY.

This institution is located 4 miles west of London, on the Charleston Pike.

The plumbing consists of: 1 water closet, 1 sink, 5 floor drains, 8 lavatories and 5 bath tubs, making a total of 20 plumbing fixtures.

The house drain is standard cast iron and stone, and the sewage discharges into a county ditch.

Existing Conditions.

This institution has two sewers,—one for the general bath rooms and one for the superintendent's bath room, which contains the only inside water closet.

The inmates are required to use outbuildings, which are of the box type and are emptied once a week, the contents being buried on the farm.

The sanitary condition of the plumbing in this institution is very poor.

Recommendations.

That the authorities in charge be requested to make the following changes:

The plumbing in this institution should be overhauled, and a system of sanitary closets installed in the male and female departments. The outbuildings, which are a nuisance, could then be abandoned.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes had been made.

MADISON COUNTY CHILDREN'S HOME.

This institution is located two and one-half miles north of London on the Marysville Pike.

The plumbing consists of: 6 water closets, 6 plain sinks, 2 floor drains, 2 lavatories and 4 bath tubs, making a total of 20 plumbing fixtures; also one boys' privy vault.

The house drain is standard cast iron pipe, and the sewage discharges into a cesspool which overflows into a county ditch.

Existing Conditions.

The sanitary condition of the plumbing in this institution is good.

Recommendations.

That the authorities in charge be requested to make the following changes:

The water closet bowl in the cellar should be cleaned.

The sewer opening in the boys' toilet room should be closed, to keep the sewer air from the building.

The water closet in the girls' toilet room should be repaired.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes had been made.

WILBERFORCE UNIVERSITY.

Combined Normal and Industrial Department.

This institution is located in the village of Wilberforce, Greene County, and is composed of the new building; Arnett Hall; Galloway

Hall; armory; printing and carpenter shop; Oneb Hall; boiler house and 7 cottages.

The plumbing is composed of: 27 water closets, 4 slop sinks, 11 plain sinks, 5 urinals, 5 floor drains, 36 lavatories, 9 bath tubs, 7 shower baths, 9 laundry trays, making a total of 113 plumbing fixtures.

The house drain is of standard cast iron and stone pipe, and the sewage discharges into a sewage disposal plant.

Existing Conditions.

The condition of the plumbing is fair. This college is teaching a course in plumbing, and the students are given practical lessons on new and repair work.

The printing and carpenters' school building is without toilet facilities.

Recommendations.

A toilet room should be provided for the use of the students in the printing and carpenters' school building.

The water used in these buildings is taken from a well, and its chemical action is very severe upon the boilers, pipes and fixtures. It would be a matter of economy to provide this institution with a water softener.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and informed the Board that the toilets would be provided when funds were available,—viz., February 15, 1912. The authorities further advised that no funds were available under their present appropriations for the construction of the water-softening plant, but that such funds would be asked for in the next appropriation.

WARREN COUNTY INFIRMARY.

This institution is located south of Lebanon, on the South Lebanon Pike.

The plumbing is composed of: 11 water closets, 1 plain sink, 2 urinals, 2 floor drains, 12 lavatories and 7 bath tubs, making a total of 35 plumbing fixtures.

The house drain is composed of iron and stone pipe. One system of sewerage discharges into a cesspool, and another into an open ditch which empties into Turtle Creek.

Existing Conditions.

The plumbing in the superintendent's bath room is good, but in the hospital and inmates' department is poor.

The water closet and bath tub in the hospital discharges into an open cesspool beneath this building, which is flushed by a drain from the fields.

The kitchen sink, floor drain in rear kitchen and wash basins in superintendent's kitchen are without traps.

The wash basin in the superintendent's kitchen is connected with tin pipe.

Three water closets in men's department on the 3rd floor are in bad shape.

The seats on the water closets in women's department on first floor are broken.

Recommendations.

That the authorities in charge be requested to abandon the open cesspool beneath the hospital building, and connect the bath tub and water closet directly to the sewer.

Trap sink in kitchen, floor drain in rear kitchen and wash stands in the superintendent's kitchen.

Replace water closets on 3rd floor in men's department with closets that will flush properly.

Remove old privy vault.

Paint, re-varnish and repair water closet seats.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that the changes would be made.

CRAWFORD COUNTY INFIRMARY.

This institution is located four miles southeast of Bucyrus on the Bucyrus & Galion Pike.

The plumbing is composed of: 11 water closets, 7 plain sinks, 3 urinals, 1 floor drain, 1 yard drain, 6 lavatories, 3 bath tubs and 3 laundry trays, making a total of 35 plumbing fixtures.

Existing Conditions.

The sanitary condition of the plumbing in this institution is good. With few exceptions, the toilet rooms and fixtures are neat and clean. This system of plumbing was installed recently, and is in good condition.

The sewerage system is entirely of extra heavy cast iron, well supported, with cleanouts at every change in direction, Y fittings used exclusively and all fixtures properly trapped. The entire sewerage system discharges into a sewage disposal plant.

WYANDOT COUNTY INFIRMARY.

This institution is located three and one-half miles north of Upper Sandusky, on the Carey and Upper Sandusky Pike.

The plumbing is composed of: 2 plain sinks, 4 floor drains, 3 bath tubs and 3 laundry trays, making a total of 12 plumbing fixtures; also 3 outhouses.

The house drain is of standard cast iron and stone, and discharges into Little Tomac Creek.

Existing Conditions.

The plumbing and sanitary condition of this institution are very poor.

The fixtures are without traps.

The 3 outhouses have troughs on sleds, which are emptied once every three months somewhere on the farm. Vessels are used by the inmates, and emptied once a day.

Recommendations.

That the authorities in charge be requested to have the entire plumbing system in this institution overhauled, a system of sanitary closets installed and the sewerage system connected to a sewage disposal plant. The outbuildings, which are a nuisance, could then be abandoned.

The State Board of Health approved the foregoing recommendations, the authorities in charge of the institution were notified, and later informed the Board that they had taken the matter under advisement.

MARION COUNTY CHILDREN'S HOME.

This institution is located two miles south of Marion on the Delaware & Marion Pike.

The plumbing is composed of: 10 water closets, 3 plain sinks, 7 floor drains, 4 lavatories, 2 wash ranges, 5 bath tubs, 1 shower bath, 1 drinking fountain and 1 laundry trap, making a total of 34 plumbing fixtures.

The house drain is of standard cast iron and stone, and the sewage discharges into a cesspool which overflows into Ququa Creek.

Existing Conditions.

The plumbing and sanitary conditions of this institution are good. The toilet, bath room and fixtures are kept neat and clean.

MARION COUNTY INFIRMARY.

This institution is located two miles east of Marion, on the Claretton & Marion Pike.

The plumbing is composed of: 3 plain sinks, 1 urinal, 5 floor drains, 4 lavatories, 3 bath tubs, 1 dish-washer and 2 laundry trays, making a total of 19 plumbing fixtures; also 3 outbuildings with troughs.

The house drain is of standard cast iron and stone, and the sewage discharges into a county ditch.

Existing Conditions.

The plumbing and sanitary condition of this institution are very poor.

The three outbuildings are provided with troughs, which are emptied once a week somewhere on the farm.

Two of the three bath tubs are of the old style copper, and are in very bad condition.

Sink in kitchen and wash stand in superintendent's bedroom are without traps.

Recommendations.

The entire plumbing in this institution should be overhauled and a new sewerage system installed, with a system of sanitary closets connected to a sewage disposal plant.

The State Board of Health approved the foregoing recommendations, the authorities in charge were notified, and later informed the Board that the county commissioners, had employed an architect to make preliminary sketches to comply with the recommendations.

CHAMPAIGN COUNTY CHILDREN'S HOME.

This institution is located on East Lawn Avenue, Urbana.

The plumbing consists of: 4 water closets, 3 plain sinks, 1 urinal trough, 1 floor drain, 7 lavatories, 1 wash sink, 4 bath tubs and 6 laundry trays, making a total of 27 plumbing fixtures.

The house drain is of standard cast iron pipe, and the sewage discharges into a cesspool which overflows into Dugan Ditch.

Existing Conditions.

The sanitary condition of the plumbing in this institution is fair. The toilet rooms and fixtures are kept neat and clean.

The vent pipe from the kitchen sink has been disconnected, allowing sewer air to be discharged into the room.

The ice box waste is connected directly to the sewer.

The sink on first floor is not trapped.

The two outside privy vaults are in very bad condition.

Recommendations.

That the authorities in charge be requested to make the following changes:

Connect vent pipe under kitchen sink in basement.

Trap sink on first floor.

Disconnect ice box waste from sewer and discharge same into a floor drain properly trapped.

Clean, fill and abandon privy vaults in yard, and install sanitary closets. These can be installed in the basement beneath the boys' and girls' cottages, as both sewer and water connections are convenient. These fixtures should be of the juvenile pattern.

The State Board of Health approved the foregoing recommendations, and the authorities in charge of the institution were notified.

Upon request of the superintendent, and in order to have a more thorough understanding of the suggestions made, the state inspector of plumbing again visited this institution. The changes suggested were given careful consideration, and the authorities agreed to make the improvements.

CHAMPAIGN COUNTY INFIRMARY.

This institution is located two and one-half miles south of Urbana, on the Springfield Pike.

The plumbing consists of: 14 water closets, 2 slop sinks, 5 plain sinks, 11 floor drains, 5 lavatories and 5 bath tubs, making a total of 42 plumbing fixtures.

The house drain is of standard cast iron and stone, and the sewage discharges into a cesspool which overflows into Infirmary Creek.

Existing Conditions.

The sanitary condition of the plumbing in the women's department in the main building is fair; in the men's department it is poor, and in the hospital it is very bad.

The floor drains in the men's department are connected to the sewer without traps.

The men's privy vault is in very bad condition.

A hopper closet on the second floor of the hospital is without water connection. There are 4 of these hoppers in bedrooms on this same floor.

The 5 water closets on the first floor of this building are provided with tanks.

There is an open sewer running the full length of the cellar beneath this building.

Recommendations.

The plumbing in the hospital building should be remodeled, and the practice of installing water closets in sleeping rooms be avoided, unless they are furnish with a mechanical means of ventilation and automatic flushing device.

The privy vault should be cleaned, filled and abandoned, and a system of sanitary closets and bath rooms installed in the men's department in the main building.

The old copper bath tub should be replaced with enameled iron.

Floor drains in men's department should be properly trapped before entering sewer.

The State Board of Health approved the foregoing recommendations, and the authorities in charge of this institution were notified. Upon request, and in order that the authorities have a more thorough understanding of the recommendations made, and that estimates be secured on the proposed changes, the state inspector of plumbing again visited

this institution. The changes contemplated were given careful consideration and explained in detail to the superintendent, in order that the same might be submitted to the county commissioners.

MIAMI COUNTY CHILDREN'S HOME.

This institution is located four miles east of Troy, on the Casstown Pike.

The plumbing consists of: 8 water closets, 2 slop sinks, 4 plain sinks, 1 urinal, 3 floor drains, 10 lavatories, 6 bath tubs and 4 laundry trays, making a total of 38 plumbing fixtures; also 4 outside privy vaults.

The house drain is of standard cast iron and stone pipe, and the sewage discharges into Lost Creek.

Existing Conditions.

The condition of the plumbing is good. The toilet rooms and fixtures are kept neat and clean.

The privy vaults are of brick and in fair condition at present. Two of these privy vaults are for the school house, which has no plumbing.

The 4 inch open sewer connection in the basement of the laundry, used as a floor drain, is not trapped.

Recommendations.

That the authorities in charge be requested to place a trap and an iron floor drain in the basement under laundry, or set slop sinks flush with cement floor, properly trapped, to receive the waste from laundry and intercept any foreign matter.

Provisions should be made to abandon the privy vault and install sanitary closets. While these privy vaults are in fair condition at present, it will only require a few years to make them become a nuisance and a detriment to the health of the inmates, and mar the general good sanitary conditions which are to be found in this institution.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and later informed the Board that these changes would be made.

MIAMI COUNTY INFIRMARY.

This institution is located one and one-half miles north of Troy, on the Troy & Piqua Pike.

The plumbing consists of: 44 water closets, 8 plain sinks, 11 floor drains, 8 lavatories, 6 bath tubs and 11 laundry trays, making a total of 78 plumbing fixtures; also 2 outside privy vaults.

The house drain is of standard cast iron and stone pipe, and the sewage discharges into a county ditch which empties into the Great Miami River.

Existing Conditions.

The sanitary condition of the plumbing in this institution is poor.

Lavatory in basement, sink in men's dining room and sink in female cottage are not trapped.

There is an open sewer connection in the main cottage without trap.

There are 18 hopper water closets with traps 2 feet below the hopper, in the male and female cottage or hospital. These hoppers are located in sleeping rooms and flushed with a half inch pipe, the valve of which is located in the hall.

Two of these hoppers had been removed and the rooms converted into dining rooms. The openings in the floor, not having been properly sealed, allow the passage of sewer air into these dining rooms.

The vent connection from water closets in main building and the ladies' toilet room have been disconnected and the pipes left open permitting the discharge of sewer air into the buildings.

Recommendations.

That the authorities in charge be requested to have all fixtures properly trapped and placed in a sanitary condition.

That the privy vaults be cleaned, filled and abandoned.

That the plumbing in the hospital building should be remodeled, and the practice of installing water closets in sleeping rooms be avoided unless furnished with a mechanical means of ventilation and an automatic flushing device.

There are 18 4-inch iron soil pipe lines running from the cellar floor to the second floor of this building, none of which is carried through the roof for ventilating purposes. This pipe could be used to good advantage if carefully removed, and would be sufficient for an entire new system.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and informed the Board that the changes were being considered and would be made.

FAYETTE COUNTY CHILDREN'S HOME.

This institution is located two and one-half miles south of Washington C. H., on the Children's Home Road.

The plumbing consists of: 13 water closets, 1 plain sink, 17 lavatories, 10 bath tubs, making a total of 41 plumbing fixtures; also 2 out-houses with troughs.

The house drain is of standard cast iron and stone pipe, and the sewage discharges into a leaching cesspool 250 feet from the building.

Existing Conditions.

The sanitary condition of the plumbing in general is good. All fixtures are trapped, and the toilet rooms and fixtures are kept neat and clean.

The institution is composed of four buildings,—the main building, boys' cottage girls' cottage and hospital. The hospital has plumbing fixtures installed, but no provisions have been made to supply them with water.

The two outhouses are in very bad condition, and as inside toilet rooms are provided, they could easily be abandoned.

Recommendations.

Clean, fill and remove outhouses, and use the inside toilet rooms. These houses mar the general good sanitary conditions that are to be found in this institution.

Run water supply to the hospital building, and connect fixtures with the same. The hospital by all means should be equipped with a water supply.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and later informed the Board that the changes had been made.

FAYETTE COUNTY INFIRMARY.

This institution is located two miles south of Washington C. H.

The plumbing consists of: 5 water closets, 1 plain sink, 6 lavatories, 5 bath tubs, making a total of 17 plumbing fixtures; also 1 outhouse.

The house drain is of standard cast iron pipe, and the sewage discharges into a leaching cesspool which empties into Catfish Creek.

Existing Conditions.

The sanitary condition of the plumbing in this institution is fair. The toilet rooms and fixtures are kept neat and clean.

The outside privy is in very bad condition, and should be removed.

Recommendations.

That the authorities in charge be requested to discontinue the use of and remove the building as an outhouse.

The State Board of Health approved the foregoing recommendations, the authorities in charge of this institution were notified, and later informed the Board that this outbuilding had been removed.

INSPECTION OF NEW SYSTEMS.

STATE HOUSE.

Toilet Room for Governor's Office.

The plumbing in this toilet room consists of one water closet and one lavatory.

The installation is in accordance with the state plumbing laws.

This toilet room, which has no window to the outer air, is provided with an electric exhaust fan, creating a mechanical means of ventilation.

This work was tested and inspected, and a certificate of approval issued.

KNIGHTS OF PYTHIAS HALL—WASHINGTON C. H.

This building is located at 222 N Fayette St.

The plumbing consists of 3 water closets, 3 lavatories and 1 sink, a total of 7 plumbing fixtures.

The house drain is of cast iron, and the sewage discharges into the city sewerage system.

The installation was in accordance with the specifications. The work was tested and a certificate of approval issued.

SUNNYSIDE SCHOOL—WASHINGTON C. H.

The plumbing in this building consists of 11 range closets in 2 ranges and 6 urinals.

The house drain is of stone pipe, and the sewage discharges into the city sewerage system.

The installation was in accordance with the specifications. The work was inspected and changes recommended to the board of education and plumbing contractor, in order that a certificate of approval could be issued. These recommendations have not been complied with.

EAST SIDE SCHOOL—WASHINGTON C. H.

The plumbing in this building consists of 16 range closets in 2 ranges, and 9 urinals.

The house drain is of stone pipe, and the sewage discharges into the city sewerage system.

The installation was in accordance with the specifications, and the work was inspected and changes recommended to the board of education and plumbing contractor, in order that a certificate of approval could be issued. These recommendations have not been complied with.

CAMPBELL SCHOOL—IRONTON.

The plumbing in this building consists of 2-6 compartment ranges; 1-7 compartment range; 1-5 compartment range; 2 urinals; 2 drinking fountains and 4 floor drains, making a total of 32 plumbing fixtures.

The house drain is of 6-inch extra heavy cast iron pipe, and the sewage discharges into the city sewerage system.

Two inspections and tests were made: the first by the water test; the second or final with the smoke test.

The installation is in accordance with the state law, the work inspected and a certificate of approval issued.

SUMMARY.

	New Buildings Ap- proved.	New Buildings Disap- proved.	Old Buildings Ap- proved.	Old Buildings Disap- proved.	Changes Ordered.	Plans, Specifications Approved.	Plans, Specifications Disapproved.	First Inspection.	Second Inspection.	Final Inspection.	Certificates Issued.	Prosecutions.	Miscellaneous.	Total.	Buildings Approved, No Fees Charged.	Buildings Approved, Fees Charged.	Fees Collected.
June	1	5	.....	2	.....	6	.....	.....	.....	.....	.....	.....	3	11	.....	.....	.....
July	1	7	.....	1	.....	8	.....	.....	.....	.....	.....	.....	3	11	.....	.....	.....
August	2	10	.....	4	7	3	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	.....
September	1	.....	.....	3	.....	12	.....	.....	.....	.....	.....	.....	1	4	.....	.....	.....
October	1	2	.....	3	15	3	.....	.....	.....	.....	.....	.....	1	26	1	1	\$5 00
November .....	.....	.....	.....	1	2	1	.....	.....	.....	.....	.....	.....	1	7	.....	.....	.....
December	1	2	.....	3	.....	3	.....	.....	.....	.....	.....	.....	3	12	3	.....	15 00
	7	26	26	16	5	33	1	1	1	.....	14	97	1	4	\$20 00		

STATE AND MUNICIPAL INSPECTIONS.

Investigation shows that there are 781 municipal corporations in the state of Ohio.

Eighty-two of this number have a population of more than 5,000.

Twenty-seven of the 82 have local plumbing regulations, and each code differs from the other, which proves the necessity of a minimum standard, universal, state plumbing code.

Fifty-five of the 82 cities with a population of more than 5,000 are without regulations.

Of the 699 municipal corporations with a population of less than 5,000, one, Orrville has plumbing inspection and regulations.

A more comprehensive idea can be had from the following classification of cities in relation to the inspection of plumbing and regulations:

Population 100,000 or more.

	Population.	
Cleveland	560,663	Local inspection.
Cincinnati	363,591	" "
Columbus	181,511	" "
Toledo	168,497	" "
Dayton	116,577	" "

Population 50,000 or more.

	Population.	
Akron	69,067	Local inspection.
Canton	50,217	" "
Youngstown	79,066	" "

Population 25,000 or more.

	<i>Population.</i>	
Lorain	28,883	Local inspection.
Hamilton	35,279	No "
Lima	30,508	" "
Newark	25,404	" "
Springfield	46,921	" "
Zanesville	28,026	" "

Population 12,000 or more.

	<i>Population.</i>	
Alliance	15,083	Local inspection.
Ashtabula	18,266	" "
Bellaire	12,946	" "
Lakewood	15,181	" "
Massillon	13,879	" "
Norwood	16,185	" "
Sandusky	19,989	" "
Chillicothe	14,508	No "
East Liverpool	20,387	" "
Elyria	14,825	" "
Findlay	14,858	" "
Ironton	13,147	" "
Mansfield	20,768	" "
Marietta	12,923	" "
Marion	18,232	" "
Middletown	13,152	" "
Piqua	13,388	" "
Portsmouth	23,481	" "
Steubenville	22,391	" "

Population 5,000 or more.

	<i>Population.</i>	
Barberton	9,410	Has regulations.
Cambridge	11,327	" "
Coshocton	9,603	" "
East Cleveland	9,179	" "
Fostoria	9,597	" "
Greenville	6,237	" "
Jackson	5,468	" "
St. Marys	5,732	" "
Warren	11,081	" "
Wellsville	7,769	" "
Xenia	8,706	" "

The result of this investigation shows that this department has jurisdiction over the plumbing in all buildings excepting single and double residences, in

5	municipal corporations with a population of more than.....	25,000
12	" " " " " " " "	12,000
35	" " " " " " " "	5,000
698	" " " " " " less "	5,000

753

a total of 753 municipal corporations that are without local regulations and dependent upon this department for plumbing inspection.

In addition to the foregoing, there are

- 88 county infirmaries.
- 54 district and county children's homes.
- 12 state institutions.
- 8 state hospitals.
- 4 universities.

a total of 166 state and county institutions to be inspected.

The condition that existed in 23 of the 28 institutions already inspected, warrant the inspection of the remain 134 at the earliest possible date.

In many of the smaller cities mentioned, plumbing regulations have been adopted by local boards of health or city councils, but the laws are not enforced, owing to the fact that these cities are not in a position to maintain local inspection.

Local boards of health in cities having a population of 12,000 or more should be required by law to appoint a local inspector of plumbing, and by the establishment of the fee system the office could be made partially if not entirely self-sustaining. Very good results have been obtained by charging fifty cents for a permit, twenty-five cents for each plumbing fixture installed up to ten, and ten cents for each additional fixture.

By this method each property owner pays a small fee, and in return receives the inspector's services and a guarantee that the installation is in accord with good sanitary practice. •

The smaller cities must depend upon the state department for inspection.

It is essential that cities should have home rule in the appointment of local inspectors and the enforcement of the law, but the state should establish a minimum law for these cities.

In order to carry out the express provisions of Part Four, Ohio State Building Code, which makes it the duty of the State Board of Health to make at least two (the first or water and the final or smoke) inspections of the plumbing and drainage of every public, semi-public or quasi-public building in the 753 municipal corporations that

are without local inspectors, provision should be made for additional inspectors.

The beneficial effects of this law will depend upon its proper enforcement, and this the state has ample power to provide.

TESTS OF PLUMBING APPARATUS.

The difference of opinions of many who might be classed as authorities on plumbing, in relation to the various methods of construction, resulted in many conferences during the year.

The state law has provided cities having local plumbing inspection with home rule, but there should be a standard, universal law for these cities, and the State Board of Health, through this department, should be in a position to conduct tests and research, which would prove in facts and figures the proper methods of construction, both from an economical as well as a sanitary standpoint.

These findings could then be converted into law in the interest of health and economy, and the people of Ohio benefited thereby.

A great many interpretations and rulings have been requested upon the state laws, and others have been suggested. Many interpretations were approved as suggested. Others were requests to the State Board of Health to change the express provisions of a statute, and were referred to the Attorney General for his opinion, relative to the limitations of the authority vested in the Board.

Through the courtesy of the University of Illinois, drawings and specifications were submitted and arrangement made to conduct a series of tests upon various methods of construction, which are sure to prove valuable.

The State of Ohio should be in a position to work out the problems that present themselves from time to time, without having to depend upon the courtesies of a sister state. A proposition to have these tests made at the Ohio State University was made to the president of that institution, but no reply was received.

COOPERATION OF ARCHITECTS, PLUMBERS, SANITARY ENGINEERS, HEALTH OFFICERS, PLUMBING INSPECTORS, OWNERS, SUPERINTENDENTS, ETC.

The willingness of architects, sanitary engineers, health officers, plumbing inspectors, superintendents, owners, etc., in cooperating with this department in bringing about better sanitary conditions in buildings, is to be commended.

Appreciating, as I do, the difficulties encountered in the designing of plumbing systems for buildings, so that they can be installed for the available money, it is indeed a pleasure to know that all are working in harmony. In the end, the persons who are benefitted are the owners

of private institutions, or taxpayers, in the case of a public building, for the additions required are made to add to the sanitary conditions of the building and to the health and convenience of the occupants.

There have been some differences of opinions relative to the provisions of the state code, which has been severely criticised; but the commendations have overcome the criticism. This department solicited criticism upon the many provisions of the state code.

Through the operation of the law, we will discover changes that should be made; as the work progresses, the code will be broadened to meet efficiency and economy, but efficiency should never be sacrificed for economy.

GENERAL.

Reviewing the results generally, I may say they are very gratifying. That conditions have been improved goes without saying, as each institution visited, when recommendations are made for the betterment of the sanitary conditions, means some improvement and some benefit to those intended to be beneficiaries.

To those directly in charge of the state and county institutions, I wish to say that "Low first cost and the employment of men to install and repair plumbing who are not versed in the practice, is often mistaken economy, as frequency of repair and deterioration of cheap and defective material and faulty workmanship will more than offset the initial saving."

In conclusion, I desire to extend to the members of the State Board of Health, to the Secretary and Acting Secretary, my sincere thanks for the cordial treatment and attention accorded me at all times, and to assure them all of my appreciation of their counsel and advice, which has been so beneficial to me in the organization and work of the department.

Respectfully submitted,

WM. C. GROENIGER,
State Inspector of Plumbing.

CITY AND VILLAGE HEALTH OFFICERS

(Corrected to June 1st, 1912)

(517)

HEALTH OFFICERS IN CITIES AND VILLAGES.

Place.	Name.
Aberdeen	Dr. A. R. Carregan.
Ada	James F. Jamison.
*Adamsville	Dr. W. C. Kinner.
*Addyston	Louis Buckwalt.
Adelphi	John S. Gooden.
*Adena	John Hurl.
*Agosta P. O. (New Bloomington)...	W. H. Carey.
Akron	Dr. A. A. Kohler.
Albany	Walter Neff.
*Alexandria	Wm. H. Proctor.
*Alger	Sant Newland.
Alliance	Dr. W. H. Burns.
Alvordton	George Pifer.
Amanda	George Boerstler.
*Amelia	Dr. Homer C. Behymer.
Amesville	Dr. G. E. Flinn.
*Amherst	Dr. Washinton Foster.
*Amsterdam	S. H. Carter.
Andover	William Shipman.
*Anna	Dr. Edwin A. Steely.
*Ansonia	Dr. J. C. Poling.
*Antioch	Dr. D. W. Lowe.
*Antwerp	Samuel Boylan.
*Apple Creek	Harry H. Wilhelm.
*Arcadia	Joseph Boley.
Arcanum	
*Archbold	August Ruibley.
Arlington	Thomas B. Trovinger.
*Arlington Heights	Wm. L. Goertemiller.
Arnetttsville (Pitsburg P. O.)	Dr. J. O. Starr.
Ashville	John Johnson.
*Ashley	Dennis G. Welch, D. D. S.
*Ashland	Dr. W. H. Roasberry.
Ashtabula	Dr. A. W. Hopkins.
*Athalia	C. M. Defoor.
Athens	Dr. J. M. Higgins.
*Attica	John A. Ritz.
Avon	Dr. John R. Pipes.
*Bainbridge	Dr. W. W. Davis.
*Bairdstown	M. E. Carmean.
Baltic	Simon P. Lower.
Baltimore	Noah B. Swartz.
Barberton	Dr. W. A. Mansfield.

* In lieu of a board of health.

Place.	Name.
Barnesville	J. W. Fowler.
Barnhill	Lewis Just.
Basil	T. F. Basch.
Batavia	Peter Ballinger.
*Batesville	Caleb Mercer.
*Bay (See North Dover P. O.)	
Beach City '	Theodore F. Stamm.
*Beallsville	Dr. W. S. Burcher.
*Beaver	G. W. Miller.
Beaver Dam	Dr. E. C. Yingling.
Bedford	Dr. W. H. Black.
Bellaire	Dr. D. W. Boone.
Bellbrook	John R. Whitacre.
*Belle Center	Charles R. Mains.
Bellefontaine	Dr. A. J. McCracken.
*Belle Valley	F. M. Dennis.
Belleville	Dr. J. W. Kelly.
Bellevue	Dr. J. F. Miller.
Belmont	David Pangle.
Belmore	Dr. G. B. Adrian.
Beloit	R. H. Oswalt.
Belpre	Jesse McGrew.
Benton Ridge	Dr. R. D. Whisler,
Berea	Dr. A. A. Smith.
*Bergholz	Petsey Daugherty.
*Berlin Heights	Dr. W. G. Hine.
*Berne P. O. (Carlisle)	J. M. Buckner.
*Bethel	Fred H. Scott.
*Bethesda	Dr. D. T. Phillips.
*Bettsville	Henry M. Craig.
Beverly	Fred H. Hart.
Bexley	Daniel P. Bailey.
*Blakeslee	R. F. Jones.
*Blanchester	A. Titus.
*Bloomdale	Dr. Chas. B. Hatfield.
Bloomfield (See Bloomingdale P. O.)	
*Bloomingburg	G. W. Gordon.
Bloomington P. O. (Bloomfield)	E. R. Blackburn, Clerk.
*Bloomington (Wooster P. O.)	Prof. John G. Black.
Bloomville	Dr. D. W. Fellers.
Bluffton	Dr. R. E. Hughson.
*Bolivar	W. T. Smith.
*Boston (See Owensville P. O.)	
*Botkins	Dr. Frederick R. McVay.
Bourneville	Alvin A. Lojry.
*Bowerston	R. H. Gordon.
*Bowersville	J. E. Steward.
Bowling Green	W. E. Avery.
*Bradford	Dr. H. M. Forman.
*Bradner	O. J. Mitchell.

* In lieu of a board of health.

Place.	Name.
*Bratenahl	Alexis J. Imhoff.
*Bremen	Dr. A. A. Bradford.
*Bridgeport	Wm. H. Cox.
Brilliant	Frank Barcus.
*Brink Haven P. O. (Gann)	W. D. Heaton.
*Brooklyn Heights	Joseph E. Richardson, Cleve- land, R. D. No. 3.
*Brookside	Fred Elslager, Box 469, Bridge- port.
Brooksville	B. F. Shafer.
*Broughton	Eli Berrier.
Bryan	R. M. Rice.
*Buchtel	Will Wright.
Buckeye City	F. M. Welker.
*Buckland	Dr. R. W. Sharp.
Bucyrus	Dr. A. H. McCrory.
*Burbank	A. W. Hoffman.
Burkettsville	Dr. E. L. A. Brown.
*Burton	Dr. A. D. Warner.
*Butler	John W. Long.
*Butlerville	Z. S. Mazlott.
*Byesville	B. L. Nicholson.
*Cadiz	Dr. Wm. H. Lemmon.
Calais	O. S. Carpenter.
*Caldwell	W. L. Evans.
Caledonia	Philip Meister.
Cambridge	Dr. W. T. Ramsey.
*Camden	Dr. Geo. W. Homsher.
*Canal Dover	John J. Jurgess.
*Canal Fulton	John Ronan.
*Canal Winchester	Dr. J. W. Shook.
Canfield	Roscoe A. Brown.
*Cannelsville (See Dillon P. O.)	
Canton	Dr. Frank Da Hinden.
*Cardington	W. J. Purvis.
*Carey	Joseph F. Wonder.
*Carlisle (See Berne P. O.)	
Carroll	Dr. C. A. Barrow.
Carrollton	Dr. R. E. Miller.
*Casstown	Dr. Foster D. Kiser.
Castine	Wirt Jenkins.
Catawba	Forest Mahan.
*Cecil	Dr. F. F. Demuth.
Cedarville	Samuel Albright.
Celina	Dr. Joseph Sager.
Centerburg	J. C. Coe.
Centerville (Montgomery Co.)	Lester Eagle.
Centerville (Gallia Co.) See Thurman P. O.	

* In lieu of a board of health.

Place.	Name.
*Chagrin Falls	John W. Steever.
*Chambersburg (See Eureka P. O.)...	
*Chardon	Rufus Smith.
*Chatfield	Samuel Lutz.
Chauncey	W. T. Sprague.
Chesapeake	C. E. Walters.
*Chesterhill	Wm. Johnson.
*Cheesterville	C. W. Mather.
*Cheviot	L. Scott Getzendanner.
Chicago	J. H. Jefferson, V. S.
*Chickasaw	John P. Krocger.
Chillicothe	Dr. W. S. Scott.
Cincinnati	Dr. J. H. Landis.
Circleville	Harry S. Sheets.
Clarington	Floyd Noble.
*Clarksburg	John E. Morrill.
*Clarksville	Frank Hoggatt.
Cleveland	Dr. Martin Friedrich.
*Cleveland Heights	Dr. Emil H. Stone, 5607 Euclid Ave., Cleveland.
Cleves	Dr. Charles W. Smedley.
*Clifton	Dr. Frank G. Adams.
Clinton (See Fitchville P. O.)	
*Cloverdale	Dr. J. E. Stephan.
Clyde	Jesse Beard.
*Coal Grove	Dr. William Shattuck.
*Coalton	James Hensley.
*Coldwater	Dr. F. H. Brumm.
*College Corner	C. B. Howe.
College Hill (Cincinnati)	
Columbiana	Thos. J. Lyon.
Columbus	Dr. Louis Kahn.
*Columbus Grove	Dr. N. Seaman.
Commercial Point	Joseph Conrod.
Congress	L. S. Simon, R. D. No. 2., West Salem.
Conneaut	Dr. W. W. Wetmore.
*Continental	Daniel Noe.
Convoy	Dr. C. D. Sidle.
*Coolville	Dr. A. E. Lawrence.
Copley	
Corlett	Dr. Arthur M. Cheetham, 600 Miles Ave., Cleveland.
*Corning	Wm. Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	C. M. Reynolds.
Coshocton	Dr. F. M. Marshall.
Covington	Wm. E. Westfall.
Crestline	Dr. C. A. Marquart.
*Creston	R. M. Ewing.

* In lieu of a board of health.

Place.	Name.
Cridersville	S. DeLong.
*Crooksville	Dr. Ellis I. Dozer.
*Croton P. O. (Hartford)	Ed. E. Shafer.
*Crown City	Samuel Rouse.
*Cumberland	D. T. Phelps.
*Custar	Dr. Ivan L. Biggs.
*Cuyahoga Falls	William W. Scupholm.
*Cygnet	Dr. E. W. Misamore.
*Dalton	Dr. J. Coloman Haney.
Danville	Dr. T. E. Jefferson.
Darbyville (Orient R. D. No. 1.)	
Dayton	Dr. C. L. Patterson.
*Deavertown	Dwight James.
Deersville	W. C. Birney.
Defiance	Dr. J. D. Westrick.
*DeGraff	Thomas H. Makemson.
Delaware	Dr. F. V. Miller.
Delhi (Cincinnati)	
*Dell Roy	Dr. D. H. Schall.
*Delphos	Dr. Ezra Burnett.
Delta	George A. Everett.
Dennison	G. H. Fowler.
*Deshler	M. G. Coats.
*Dexter City	Geo. F. Ahrendts.
*Dillon P. O. (Cannelsville)	Dr. Chas. A. Dunn.
*Dillonvale	Isaac H. Case.
Donnelsville	Dr. Horace Heistand.
*Dover (See West Dover P. O.)	
*Doylestown	F. M. DeNise.
Dresden	Charles Bice.
*Drusilla (See Cloverdale P. O.)	
*Dublin	John A. Wing.
*Dunkirk	D. C. C. McLaughlin.
*Dupont	T. R. Hart.
East Cleveland	J. H. Stamberger.
East Fairfield	Dr. C. B. Ogden.
East Liverpool	Dr. G. H. Albright.
*East Palestine	Dr. J. M. Van Fossan.
*East View (See Warrensville P. O.) ..	
*East Youngstown	James A. Silar.
*Eaton	Ora Acton.
Edgerton	Dr. C. Hathaway.
*Edison	Dr. John H. Jackson.
Edon	Ed. Zwickey.
Eldorado	J. M. Kimmel.
Elgin	Elmer Coil.
Elida	Dr. H. Q. Alexander.
Elmore	Dr. S. F. Dromgold.

* In lieu of a board of health.

Place.	Name.
Elmwood Place	Dr. E. T. Busching.
Elyria	Dr. George E. French.
Empire	John Hunter.
Enon	B. C. Hebble.
*Euclid	Dr. H. B. Harper.
*Eureka P. O. (Chambersburg)	Dr. W. J. Fletcher.
*Fairfield	M. W. Lasure.
Fairmount	H. H. Canfield, Beckman Bldg. Cleveland.
*Fairport (See Fairport Harbor P. O.)	
*Fairview (See Rocky River P. O.) ..	
*Fairview (Guernsey Co.)	T. W. Johnson.
*Farmersville	C. M. Boomershine.
*Fayette	Benjamin Stoner.
*Fayetteville	Henry E. Fitzpatrick.
*Felicity	W. W. Hayden.
*Fernbank	Daniel Newbrough.
Findlay	Amos Beardsley.
Fitchville P. O. (Cinton)	S. M. Sly.
Fletcher	Dr. I. C. Kiser.
Florida	Wm. Thompson.
*Flushing	W. B. Harris.
Forest	Dr. W. H. Rabberman.
Fort Jennings	Ferd Heising.
Fort Recovery	Dr. W. C. Robeson.
Fostoria	W. N. Caldwell.
*Frankfort	John A. Davis.
*Franklin	John B. Miller.
*Frazeysburg	Dr. J. D. Flemming.
*Fredericksburg	Henry Snure.
Fredericktown	Dr. J. H. Norrick.
*Freeport (Harrison Co.)	Isaac N. Reed.
*Freeport (See Prairie Depot P. O.)	
Wood Co.	
Fremont	Dr. Bertram O. Kreilick.
Fultonham P. O. (Uniontown)	Dr. C. Z. Axline.
Gahanna	D. L. Stygler.
Galion	Dr. E. D. Helfrich.
Gallipolis	Chas. B. Robinson.
*Gambier	Fred Heagen.
*Gann (See Brinkhaven P. O.)	
*Garrettsville	Chas. D. Allen.
Geneva	Dr. F. C. Smith.
*Genoa	Edward Myers.
*Georgetown	Frank Bayne.
*Germantown	Wm. A. Arnold.
*Gettysburg	J. L. Nease.
*Geyer	J. C. Hogan.

* In lieu of a board of health.

Place.	Name.
Gibsonburg	J. P. Tierney.
*Gilboa	Dr. F. B. Black.
Girard	W. D. Cunningham.
Glandorf	Dr. J. A. Harold.
*Glendale	Clifford Allen.
Glenmont	J. C. Bresson, Sec.
*Glouster	Dr. H. G. Gibson.
*Gnadenhutten	Wm. M. Hamilton.
*Gordon	Dr. H. Z. Silver.
*Grafton	John Bardon, Sr.
Grand Rapids	G. S. Burkett.
Grand River P. O. (Richmond)	H. S. Barton.
*Grandview Heights	John B. Young, D. D. S.
*Granville	Fred Bosenberg.
Gratis P. O. (Winchester) Preble Co. . .	Dr. A. K. Follett.
Graysville	T. F. Mann.
*Green Camp	Frank J. Folk.
*Greenfield	Dr. J. D. Varney.
Greenspring	John Gallagher.
Greenville	S. A. Hawes.
*Greenwich	John H. Baker.
*Grove City	Chas. Swartz.
Groveport	Dr. C. R. Clement.
*Grover (See Tiltonville P. O.)	
*Grover Hill	T. Goliver.
*Hamden	Albert Knox.
*Hamersville	H. H. Hannah.
Hamilton	Dr. A. L. Smedley.
Hamler	William Fye.
*Hanford	W. M. Schleppe, 1937 East Main St., Columbus.
Hanging Rock	Joseph Kinkaid, Sr.
*Hanover	Dr. C. B. Cullison.
Hanoverton	Newton Steller.
*Harrisburg	Albert Deyo.
Harrison	Abe Loos.
Harrisville	W. F. Lemmon.
*Harrod	Michael Leatherman.
*Hartford (See Croton P. O.) Licking Co.	
Hartwell	George F. Laxford.
Harveysburg	W. A. Haines.
*Haskins	William H. North.
*Haviland	Ias. T. LeFevre.
Hayesville	Dr. T. R. Laughbaum.
*Hebron	W. D. Lietz.
*Helena	Merritt Lindsay.
Hemlock	Dr. R. W. Miller.
Hicksville	B. L. Kelsey.

* In lieu of a board of health.

Place.	Name.
*Higginsport	Charles Love.
Highland P. O. (New Lexington)	
*Hilliards	Dr. J. W. Reason.
Hillsboro	Dr. H. A. Russ.
Hiram	Dr. F. H. Hurd.
*Holgate	Adam Kemmer.
*Hollansburg	Dr. A. W. Meek.
*Holloway	O. A. Van Fossen.
Holmesville	C. W. McClelland.
Hopedale	W. H. Beckett.
*Hoytville	Dr. Dan B. Spitler.
*Hubbard	Dr. W. H. Button.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. Frank A. Richardson.
*Huron	Clarence F. Ward, V. S.
*Idlewood (See Warrensville P. O.)..	
Ironton	Dr. E. E. Wells.
Ithaca	Dr. Chas. J. Woods
Jackson	John S. Davis.
Jacksonboro, West Middletown P. O..	John Stamm.
*Jackson Center	Dr. John M. Carter.
Jamestown	Harry C. Lieurance.
*Jacksonville	Henry Wolfe.
*Jefferson	W. S. Andrews.
*Jeffersonville	E. W. Bargdill.
Jenera	C. H. Heldman.
*Jeromeville	Dr. George W. Whitney.
*Jerry City	D. D. Kidd.
*Jerusalem	I. B. Carleton.
*Jewett	Dr. W. L. England.
Johnstown	Dr. E. S. Rutledge.
Junction City	Dr. H. W. Shaw.
*Kalida	Dr. J. D. Watterson.
Kelleys Island	Geo. P. Schardt.
*Kenmore	Dr. Earl Z. Alspach.
*Kennedy Heights, (Kennedy P. O.)..	Dr. G. F. Schwenkmeyer.
Kent	F. H. Vickers.
Kenton	Joe Bonham.
*Kettlerville	Dr. O. O. Lemaster.
Killbuck	Wm. C. Stout.
Kimbolton	W. G. Alloway.
Kingston	F. P. Long.
*Kirby	Dr. E. E. Burns.
*Kirkersville	George Carrico.
Lafayette	Dr. N. Sager.
La Grange	Dr. J. W. Lindsey.

* In lieu of a board of health.

Place.	Name.
Lakeside	Dr. Ralph L. Watters.
Lakeview	Elba L. Van Horn.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. J. P. Hershberger.
*Larue	David Lamb.
*Latty	Chas. N. Howell.
*Laura	W. C. Williamson.
Laurelville	Dr. W. D. Cain.
Lebanon	Dr. A. W. Mardis.
*Leesburg (See Leesville P. O.).....	
Leesburg (Highland Co.)	Dr. W. B. Roads.
*Leesville P. O. (Leesburg)	W. C. Sharp.
Leetonia	Dr. S. R. McCready.
*Leipsic	Dr. Wm. L. Werner.
*LeRoy	Rodney Russell.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.
*Lexington	Dr. Henry Howard Smith.
*Liberty Center	L. K. Allen.
Lima	Dr. A. L. Jones.
*Limaville	S. E. Beltz.
*Linden Heights	John L. Mulligan.
*Lindsey	Dr. E. V. Berry.
*Linndale	Frank Letterle
*Lisbon	James Stackhouse.
*Lithopolis	E. E. Myers.
*Lockbourne	A. E. Harrison.
Lockington	Dr. J. Robt. Caywood Clk.
*Lockland	Valentine Harting.
*Lodi	A. W. Kinney.
*Logan	J. H. Carnes.
*London	Dr. John W. Parker.
*Lorain	Dr. Edward V. Hug.
*Loramie	Fred Anthony.
*Lore City	Chas. R. Heidleback.
Loudonville	Walter S. Young.
Louisville	Dr. F. W. Schilling.
*Loveland	Dr. J. D. Wakefield.
Lowell	A. J. Thompson.
*Lowellville	Rodger Horn.
*Lower Salem	Aaron Hartshorn.
*Lucas	Dr. J. M. Hyde.
*Lynchburg	Sylvester S. Puckett.
*Lyons	Dr. Thos. Blair..
*McArthur	George W. Specht.
McClure	E. E. Britton.
*McComb	James H. Byal.
McConnellsville	Aurelius Gorrell.
*McGuffey	H. R. Boyd.

* In lieu of a board of health.

Place.	Name.
*Macedonia	P. B. Seacoy.
*Macksburg	Samuel H. Dyer.
*Maderia	Dr. Wm. Knight.
*Madison	Dr. Wm. Sneider, Jr.
Madisonville (Cincinnati)	
Magnetic Springs	Dr. M. B. Newhouse.
*Magnolia	P. H. Blazer.
*Maineville	James G. Hill.
Malinta	W. M. Hess.
Malta	John Pennell.
Malvern	Dr. James C. McClester.
Manchester	Dr. R. W. E. Irwin.
Mansfield	Dr. Guy T. Goodman.
Mantua	E. H. Knowlton, Clk.
Marble Cliff	Dr. McKendree Smith.
*Marblehead	A. H. Elwell.
*Marengo	I. E. Eakins.
Marietta	Dr. F. S. McGee.
Marion	Addison Bain.
*Marseilles	Dr. E. S. Jones.
*Marshallville	Dr. J. J. Frase.
*Martinsburg	Dr. W. E. Shrontz.
Martins Ferry	Dr. J. W. Darrah.
*Martinsville	J. L. Loney.
*Marysville	C. W. Hoopes.
Mason	Dr. M. H. Houseworth
Massillon	Dr. T. Clarke Miller.
*Matamoras (See New Matamoras P.)	
O.	
*Maumee	Philip Hartman.
Mechanicsburg	Dr. H. Dickson.
*Medina	F. L. Harding.
*Melrose	T. J. Myers.
*Mendon	Edward C. Thomas.
*Mentor	Dr. J. W. Lowe.
Metamora	Elmer Duncan.
Miamisburg	Dr. William Shuler.
Middlefield	Dr. Frederick S. Clapp.
Middle Point	Dr. W. H. Beery.
Middleport	Dr. D. S. Hartinger.
Middletown	Dr. Geo. D. Lummis.
Midland (See Midland City P. O.)....	
Midland City P. O. (Midland).....	Dr. A. B. Martin.
Midway (See Sedalia P. O.).....	
*Miffin	George Fulmer, R. D. No. 8.
	Ashland.
*Milan	J. W. Seeley.
*Milford	Dr. F. C. Curry.
*Milford Center	Oscar Miller.
Millbury	Dr. C. M. Diebert.

* In lieu of a board of health.

Place.	Name.
Milledgeville	Dr. W. T. Mathews.
*Miller City	Chas. Kirkendall.
Millersburg	Mr. Chas. A. Estill.
*Milton (See West Milton P. O.).....	
Milton Center	Dr. J. F. Noble.
*Miltonsburg	Dr. Chas. R. Keyser.
Mineral City	Dr. C. H. Sawyer.
*Mineral Ridge	Edward Blunt.
*Minerva	Elmer E. Fultz.
*Mingo Junction	David E. Jordan.
*Minster	Joseph Brunegraff.
*Mogadore	William Saxe.
*Monroe	James F. Linn.
*Monroeville	Dr. E. R. Kreider.
*Montgomery	W. B. Ferguson.
*Montezuma	George Wade.
Montpelier	Dr. J. V. Lesnet.
*Morral	Fred McCumber.
*Morristown	Joshua DeWees.
*Morrow	Dr. Leonard Mounts.
Moscow	Dr. W. S. Purkhiser.
Mt. Airy (Cincinnati)	
Mt. Blanchard	Samuel E. Moore.
Mt. Cory	E. C. Cramer.
Mt. Eaton	Dr. C. N. Clark.
*Mt. Gilead	Dr. Geo. H. Pugh.
*Mt. Healthy	Dr. Lafayette Neufarth.
*Mt. Orab	Frank Young.
Mt. Pleasant	Thomas O. DeVault.
*Mt. Sterling	Dr. R. B. Wittich.
Mt. Vernon	Dr. H. W. Blair.
Mt. Victory	Dr. A. W. Titsworth
*Mt. Washington	Dr. W. C. Langdon.
*Mowrystown	Paul Caron.
Murray City	Dr. E. H. Hayman.
Mutual	C. M. Goul.
Napoleon	D. H. Hancock.
*Nashville	William Parsons.
Navarre	John Bailiss.
Nellie	William T. Heffelfinger.
Nelsonville	Dr. J. M. Hyde.
*Nevada	Dr. H. E. Dwire.
*Neville	Dr. A. D. Snence.
*New Albany	F. M. Heischmann
Newark	Dr. W. H. Knauss.
New Athens	Dr. A. B. Tubbs.
*New Berlin	James R. Brown.
*New Bloomington (See Agosta P. O.)	
*New Boston	Dr. W. G. Cheney.

* In lieu of a board of health.

Place.	Name.
*New Bremen	Dr. G. A. Havemann.
Newburg City	Chas. Curschman, 3382 E 113th St., Cleveland.
Newburg Heights (See Willow P. O.)	
*New Carlisle	D. F. Akers.
Newcomerstown	F. B. Angle.
*New Concord	Orrie V. Shepherd.
*New Holland	W. A. Chenault.
New Knoxville	Dr. H. E. Fledderjohann.
*New Lebanon (See Potsdam P. O.)..	
*New Lebanon (Montgomery Co.)	Leo Duff.
New Lexington (See Highland P. O.)	
*New Lexington	C. D. Anders.
New London	Wm. H. Whitney.
*New Madison	William Rieker.
*New Matamoras P. O. (Matamoras) ..	J. R. Johnson.
*New Paris	C. A. Hawley.
New Philadelphia	Dr. George H. Peck.
New Richmond	Dr. D. M. Roberts.
*New Riegel	Frank N. Dell.
*New Straitsville	Thomas Breckenridge.
*Newton Falls	Dr. H. A. Feister.
*Newtown	Dr. C. R. Campbell.
*New Vienna	Dr. E. W. Brown.
*New Washington	George B. Wolfe.
*New Waterford	A. J. Hayes.
*New Weston	Absalom Pearson.
*Ney	Dr. Park M. Lehman.
*Niles	Dr. H. V. Ormerod.
North Baltimore	Dr. G. W. Foltz.
*North Bend	Sylvester Rudisell.
*North Dover P. O. (Bay)	George L. Osborn.
North Lewisburg	Chauncey D. Creviston.
North Lindale	Hugh Geariety.
North Randall	Thomas J. Redmond.
*North Robinson	J. G. Fetter.
Norwalk	J. E. Davis.
*Norwich	Allen I. Mercer.
Norwood	Dr. Frank Perry.
*Nottingham	Dr. W. O. Jenks.
Oak Harbor	Dr. E. B. Huyck.
*Oak Hill	William Jenkins.
*Oakley	Dr. Herman H. Schulze.
Oakwood (Montgomery Co.)	
*Oakwood (Paulding Co.)	A. M. Morgan.
Oberlin	S. S. Vanausdall.
Octa	Wm. D. Hausman.
Ohio City	Clarence LeValley.
*Old Washington P. O. (Washington)	Jacob Shipman.

* In lieu of a board of health.

Place.	Name.
*Olmstead Falls	H. B. Northrop.
*Orangeville	Dr. W. C. Holbrook.
Orrville	Dr. G. H. Irwin.
*Osborn	W. B. Morrison.
Osgood	H. C. Miller.
*Osnaburg	Joseph Davenport.
*Ostrander	E. M. Smart.
*Ottawa	Dr. A. F. Sheibley.
*Ottoville	Dr. John F. Ockuly.
Otway	Simon Crow.
*Owensville P. O. (Boston).....	Dr. W. E. Leevers.
*Oxford	Dr. Chas. O. Munns.
Painesville	S. A. Haskell.
*Palestine	Mills P. Sinnison.
*Pandora	Dr. Noah S. Hilty.
Pataskala	Dr. B. B. Ashbrook.
Patterson	Benjamin Trobridge.
Paulding	Dr. John U. Fauster.
*Payne	Levi Reynolds.
*Peebles	Dr. Geo. F. Thomas.
Pemberville	August Stein.
*Peninsula	H. F. Bean.
Perrysburg	Dr. D. R. Canfield.
Perryssville	Dr. L. D. Hyatt.
Phillipsburg	S. A. Mosby, Secretary.
Philo P. O. (Taylorsville)	Benjamin Foreman.
*Pickerington	Frank Bish.
Piketon	S. H. Cutler.
*Pioneer	W. R. Norris.
Piqua	Dr. J. H. Lowe.
Pittsburg P. O. (Arnettville)	Dr. J. O. Starr.
*Plain City	J. M. White.
*Plainfield	Melville C. Woods.
*Pleasant City	Frank Schneid.
Pleasant Hill	Dr. Judson Teeter.
*Pleasant Ridge	C. H. Bowlby, D. D. S.
*Pleasantville	R. T. Parido.
Plymouth	Dr. J. Frank Holtz.
Poland	Dr. C. R. Justice.
Polk	
*Pomeroy	Dr. L. G. Gribble.
*Portage	G. R. Haight.
Port Clinton	D. J. Cargill, V. S.
*Port Jefferson	Dr. W. H. Lausten.
Portsmouth	Dr. S. B. McKerrihan.
Port Washington	Dr. F. B. Larimore.
*Port William	F. M. Strickle.
*Potsdam P. O. (New Lebanon)	H. J. Olinger.
Powhatan Point	S. J. Faulkhauser.

* In lieu of a board of health.

Place.	Name.
*Prairie Depot P. O. (Freeport)	H. E. West.
Proctorville	R. E. Atkinson.
Prospect	G. F. Gast.
Put-in-Bay	Adam Heidle.
Quaker City	Eli Hayes.
*Quincy	Dr. U. V. Speece.
*Racine	Dr. John Philson.
*Rarden	Dr. R. A. Foster.
Ravenna	Henry J. Shreader.
*Rawson	Michael Smith.
*Reading	Nicholas I. Revermann.
*Rendville	Wm. H. Shelton.
*Republic	L. P. Bishop.
*Reynoldsburg	Worral L. Orem.
Richmond (See Grand River P. O.) Lake Co.	
Richmond (Jefferson Co.)	Dr. Samuel Rothacker.
Richwood	J. F. Ledley.
*Ridgeway P. O. (West Ridgeway)	Dr. E. E. Lynch.
*Ripley	Dr. A. W. Francis.
*Rising Sun	H. M. Raub.
Rittman	Dr. G. R. Hagerman.
*Rochester	D. C. Mann.
*Rock Creek	J. E. Gladding.
Rockford	George Kimble.
*Rockport (See West Park P. O.)	
*Rockridge	Sylvester McNutt.
*Rocky River	Jacob Burkemer.
*Rogers	H. E. Byers.
Rome (See Stouts P. O.)	
*Roscoe	Samuel T. Dobson.
*Roseville	W. H. Garrett.
*Rossburg P. O. (Rossville)	C. W. Wheeler.
Rossville (See Rossburg P. O.)	
Rushlyvania	W. H. Drum.
*Rushville	W. C. Lewis.
Russellville	M. Breen.
*Sabina	Carey S. Brown.
St. Bernard	Dr. A. C. Krumpelbeck, 4527 Carthage Pike.
*St. Clairsville	Dr. S. L. West.
St. Henry	Dr. J. A. Shirack.
*St. Louisville	R. K. Walton.
St. Marys	Dr. J. E. Heap.
St. Paris	Dr. Ernest J. Burnett.
Salem	Dr. E. J. Schwartz.
*Salesville	Joseph R. Dement.

* In lieu of a board of health.

Place.	Name.
*Salineville	Dr. J. A. Sapp.
Sandusky	Dr. Henry Graefe, Jr.
*Sarahsville	Jonah Grimes.
*Sardinia	Charles B. Yearsley.
*Savanah	Simon Stahl.
Sayler Park (Cincinnati)	
Scio	Dr. G. D. Custer.
Scott	Dr. F. C. Duckwall.
Seaman	Dr. J. W. Irwin.
Sebring	Chas. Baumgartner.
Sedalia P. O. (Midway, Madison Co.)	Dr. E. B. Mead.
*Sekitan	Louis Buckwalt.
*Senecaville	Frank Morrison.
*Seven Mile	Dr. H. H. Marsh.
*Seville	Wm. H. Cotton.
*Shanesville	Dr. R. J. Stremper.
*Sharonville	Harry McGraw.
*Shawnee	Dr. Michael O'Farrell.
Shelby	Dr. Roy E. Smucker.
*Sherodsville	George Dower.
Sherwood	Dr. H. C. Lindersmith.
*Shiloh	John M. Hamilton.
*Shreve	James H. Andress.
Sidney	Wm. C. Wyma.
*Silverton	Dr. A. A. Sprague.
*Sinking Springs	John W. Covan.
*Smithfield	Dr. A. H. Kreager.
*Smithville	W. G. Zimmerman.
Somerset	Dr. Michael Clouse.
*Somerville	G. W. Dye.
South Bloomfield	
*South Charleston	Jason Mercer.
South Lebanon P. O.	Dr. V. T. Reynolds.
South Newburg	Dr. A. J. Simpson, 9001 Broad- way, Cleveland.
*South Point	Dr. William Wilson Lynd.
*South Salem	Dr. H. C. Harper.
South Solon	Dr. Fred L. Wilson.
*South Vienna P. O. (Vienna)	W. G. Harris.
*South Webster	W. H. Leive.
*South Zanesville	F. R. Bowers.
Sparta	Dr. T. A. Huggins.
Spencerville	G. A. Rusler.
*Springboro	J. B. Haines.
Springfield	Dr. I. E. Seward.
*Spring Hill	Oliver Everett.
*Spring Valley	Dr. R. W. Smith.
*Stafford	Dr. F. W. Murrey.
Steubenville	Wm. L. Westlake.
*Stockport	Dr. T. J. Lyne.

* In lieu of a board of health.

Place.	Name.
Stouts P. O. (Rome)	Dr. R. Y. Littleton.
Strasburg	Dr. J. C. Schutzbach.
Struthers	S. D. Strain.
*Stryker	John E. Meek.
Sugar Creek	Homer Finzer.
*Sugar Grove	Adam Mills.
Summerfield	Dr. R. B. Taylor.
Sunbury	J. A. Wilson.
Swanton	B. F. Mills.
*Sycamore	Dr. I. B. Gibbs.
*Sylvania	A. D. Lewis.
*Tarlton	Edward S. Ballard.
Taylorville (See Philo P. O.)	
*Terrace Park	Dr. John K. Scudder.
*Thornville	Dr. Frank R. Clemson.
Thurman P. O. (Centerville)	
Tiffin	Dr. J. A. Gosling.
*Tiltonville P. O. (Grover)	E. E. Garner.
Tippecanoe City	F. N. Agenbroad.
Tiro	Dr. G. O. Blair.
Toledo	Dr. B. Becker.
*Toronto	Thomas Shaw.
*Tontogany	Andrew F. Sautter.
Trenton	Edward Kopp.
*Trimble	Harvey Wyne.
Trinway	Chas. McGee.
*Trotwood	George C. Bunnell.
Troy	Dr. J. S. Shinn.
*Tuscarawas	J. A. Meese.
Uhrichsville	Lewis Lineberger.
Union City	Francis Bourguin.
Uniontown (See Fultonham P. O.)	
*Unionville Center	Dr. C. C. McCune.
Uniopolis	Dr. J. E. Bavliff.
*Upper Sandusky	Dr. Otto Carl Stutz.
Urbana	Dr. Richard T. Henderson.
*Utica	W. A. Hobbs.
Van Buren	O. Robbins.
*Vandalia	David Bennett.
Vanlue	Dr. James L. Schrote.
Van Wert	Dr. C. G. Church.
Venedocia	John E. Jones.
*Verona	Dr. W. I. Christian.
Vermilion	H. T. Baldwin.
Versailles	Dr. C. F. Ryan.
*Vienna (See South Vienna P. O.)	
*Vinton	Dr. J. C. Strausbaugh.

* In lieu of a board of health.

Place.	Name.
*Wadsworth	Thomas Lucas.
Waldo	Dr. Robert S. Dombaugh.
Wapakoneta	Andrew Kohler.
Warren	George N. Simpson.
*Warrensville P. O. (Idlewood)	George H. Drake.
*Warrensville (East View)	Chas. C. Murfett.
*Warsaw	Dr. E. M. Wright.
*Washington (See Old Washington P. O.)	
Washington C. H.	Will Bradfute.
*Washingtonville	William Smith.
*Waterville	Dr. H. L. Babcock.
*Wauseon	C. B. Onsted.
*Waverly	Dr. James H. McCann.
*Waynesburg	Wm. Gaggoner.
Waynesfield	Amos Shockey.
Waynesville	Dr. Thomas Sherwood.
*Wellington	Salonius A. Williams.
Wellston	James R. Ward.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	John P. Stock.
West Cario	Dr. Chas. E. Stadler.
*West Carrollton	Abraham Simpson.
*West Dover P. O. (Dover)	L. A. Williams.
West Elkton	A. W. Y. Conarroe.
Western Star	Fred Becker, R. D. No. 2, Wadsworth.
Westerville	Dr. H. L. Smith.
West Farmington	Albert Ostrom.
West Jefferson	James McCarty.
West Lafayette	W. C. Wiggins.
*West Leipsic	W. C. Miller.
*West Liberty	Dr. A. C. Brindle.
*West Manchester	A. J. Hartzell.
*West Mansfield	Dr. G. F. Plotner.
West Mentor	
West Millgrove	J. R. Jones.
*West Milton P. O. (Milton)	Dr. Herbert R. Pearson.
Weston	Dr. J. W. Williams.
*West Park P. O. (Rockport)	Dr. G. W. West.
West Ridgeway (See Ridgeway P. O.)	
West Rushville	William Kerr.
*West Salem	Dr. E. C. Raudebaugh.
West Union	A. S. Doak.
*West Unity	Samuel Ozmun.
Wharton	Dr. N. M. Crawford.
*Whitehouse	A. D. Disher.
Wilkesville	Dr. M. Z. McKibben.
*Williamsburg	Dr. G. L. Hines.
Williamsport	Dr. D. H. Marcy.

* In lieu of a board of health.

Place.	Name.
Willoughby	James Maloney.
Willow P. O. (Newburg Heights)...	Dr. F. E. Farrar.
*Willshire	Dr. J. F. Saffner.
Wilmington	Dr. G. W. Wire.
Wilmot	Julius J. Lenz.
*Winchester (Adams Co.)	Dr. Fred C. Leeds.
*Winchester (See Gratis P. O.) Preble Co.	
Windham	H. J. Higley.
*Woodsfield	Louis Hoeffler.
Woodstock	D. P. Smith.
Woodville	Dr. F. G. Blanchard.
Wooster	Dr. A. C. Knestrick.
*Worthington	T. E. Albert.
Wren	Nelson Moser.
Wyoming	Geo. H. Eversman.
Xenia	Dr. A. C. Messenger.
Yellow Springs	William Loe.
*Yorkshire	Charles E. Young.
Youngstown	Dr. H. E. Welch.
Zaleski	
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. G. W. McCormick.
*Zoar	Christian Ruof.

* In lieu of a board of health.



INDEX.

A.

	PAGE
Ada —	
Sewerage of	13, 41, 42, 114
Sewerage for	72, 82, 87, 88, 250
Acting Secretary —	
Appointment of	80
Acute Poliomyelitis —	
At Cincinnati	430, 458
At Cleveland	475
Outbreak of	6
Akron —	
Plans for tuberculosis hospital near.....	93-113
Sewage purification for.....	22
Albany —	
Water supply for.....	97, 158, 164
Alliance —	
Sewage purification at.....	145
American Public Health Association —	
Attendance at meeting of.....	36, 161
Amherst —	
Sewage purification at.....	133, 160
Water supply for.....	27, 166
Andover —	
Sewage purification for.....	107, 253
Water supply for.....	51, 168
Antitoxin —	
Distribution of	6, 40
Apple Creek —	
Water supply for.....	31, 121
Archbold —	
Approval of rules adopted by health officer.....	110
Ashland —	
Conference in re sewage purification.....	130
Water supply of.....	111
Attorney General (Opinion of) —	
Abatement of nuisance.....	134
Abatement of nuisance on state property.....	147
Adoption general sanitary rules for state property.....	147
Adoption of rules at Struthers.....	153
Adoption State Building Code.....	148
Adoption of regulations by district tuberculosis hospitals.....	147
Appeal to supreme court in re Bense Act.....	127
Compensation of employes.....	112
Enforcement of ordinance at Leipsic.....	153
Jurisdiction of State Plumbing Inspector.....	129
Jurisdiction State Board of Health in re sewer construction.....	149

	PAGE
Attorney General (Opinion of)—Concluded —	
Jurisdiction of State Plumbing Inspector.....	148
Location of cesspools.....	147
Nuisance at Oxford.....	153
Removal of health officer.....	147
Ashtabula County —	
Sewage purification for court house at Jefferson.....	138
Treatment of highways to prevent dust.....	147
Water supply at Apple Creek.....	161
Auditor of State —	
Itemized expense accounts.....	90
Automobile service —	
Payment for	48
B.	
Barberton —	
Water supply at.....	159
Batavia —	
Sewerage for	86, 91, 254
Bathing beaches —	
Pollution of, at Cleveland.....	83, 95, 412
Bauman, James E. —	
Appointed as acting secretary.....	5, 80
Beachland —	
Complaint of nuisance at.....	84
Sewage purification for.....	91, 255
Bellaire —	
Complaint against water supply of.....	123
Water purification for.....	56, 65, 172
Bellefontaine —	
Filtering material for.....	130, 133
Sewage purification for.....	133, 137
Bense Act—Complaints and Proceedings Under —	
Ada	13, 114
Bellaire	123
Bryan	60
Bryan Fertilizer Factory.....	60
Defiance	115
Delphos	69, 122, 352
East Liverpool	357
Geneva	114, 136, 368
German-American Sugar Company.....	84, 136, 143
Greenville	124
Ironton	19, 114, 128
Kenton	51, 60, 384
Lebanon	93, 143, 150
Lima	20, 84, 114, 128, 136, 143, 370, 378
Marion	51, 60, 142, 384
Marysville	20, 51, 60, 114, 384
Magnetic Springs	51, 60, 384
Plymouth	22, 34, 48, 53, 380
Pollution of Ten Mile and Sibley creeks.....	22, 93
Prospect	51, 60, 384

	PAGE
Bense Act — Complaints and Proceedings Under — Concluded —	
Salem	21, 114
Wauseon	60, 405
Zanesville	37, 122, 408
Bense Act —	
Operations under	8
Proposed amendment to	39
Big Flat Rock Creek —	
Pollution of, by German-American Sugar Company	84
Bono —	
Smallpox at	155
Boudreau, Frank G. —	
Appointed as epidemiologist	6
Bowling Green —	
Sewage purification at	144
Sewerage of	144
Bradley —	
Investigation of nuisance at	124
Bremen —	
Water supply for	68, 72, 74, 82, 100, 110, 143, 175
Bridgeport —	
Diphtheria at	156
Bryan —	
Complaint against sewage of	60
Sewage purification for	27, 112, 256
Bryan Fertilizer Factory —	
Complaint against wastes of	60, 82, 127
Buckeye Lake —	
Investigation of nuisance at	140
Bucyrus —	
Sewerage and sewage purification for	29, 260
Butler County —	
Tuberculosis hospital of	112
C.	
Cambridge —	
Pollution of Wills Creek by	45
Water supply of	12, 13, 54, 58, 76
Camp Perry —	
Sewage purification at	152
Water purification at	152
Camp Wise (Euclid) —	
Sewerage and sewage purification for	45, 49, 129, 264
Canal Fulton —	
Sewerage for	80, 267
Canton —	
Complaint against sewage from	128
Sewerage for	81, 103, 108, 269
Sewage purification for	91, 271
Water supply of	136
Carthage —	
Complaint of nuisance at	35
Centerburg —	
Conference in re water supply	117

	PAGE
Center Township, Williams County —	
Complaint against Bryan Fertilizer Factory.....	82, 127
Cesspools —	
Construction of	71
For Norfolk & Western R. R. at Claire.....	45
Chardon —	
Sewerage and sewage purification for.....	28, 272
Chicago, Illinois —	
Conference of health officials on lake pollution.....	84
Chief Engineer —	
Resignation of R. Winthrop Pratt.....	90
Appointment of W. H. Dittoe.....	90
Chlorine —	
Use of, at Cleveland.....	104
Cincinnati —	
Acute poliomyelitis at.....	430, 458
Committee on canal conditions at.....	117
Circleville —	
Water supply at.....	143
City Wastes —	
Report on collection and disposal of.....	134
Claire —	
Sewage disposal at.....	45
Clark County, Springfield Township —	
Smallpox in	113
Cleveland —	
Acute poliomyelitis at.....	475
Condition of bathing beaches at.....	83, 95, 412
Sewerage of	95, 159
Pollution of Morgan Run.....	51, 417
Investigation of nuisance at.....	146
Typhoid fever at.....	141
Use of chlorine in water supply.....	104
Cleveland Boys' Farm —	
Sewage purification for.....	80, 298
Clinton Township, Franklin County —	
Investigation of nuisance in.....	146
Clinton Township, Fulton County —	
Complaint against sewage and wastes from Wauseon.....	127
Collection and Disposal of City Wastes —	
Special report on.....	134, 153
Collins Sub-division (Toledo) —	
Sewerage for	97, 338
Columbus —	
Pollution of Scioto River.....	51, 60, 70, 118, 127, 142, 384
Sewerage and sewage purification for Kensington Addition.....	97, 274
Commercial Club of Cincinnati —	
Invitation of	38
Committee —	
On canal conditions at Cincinnati.....	117

Committees —	PAGE
On distribution of antitoxin.....	40
On improvement of Mill Creek.....	25
On inspection sewage disposal plant at Xenia.....	123
On inspection Swan Creek and Ten Mile Creek at Toledo.....	122
On joint meeting of railway with federal and state health authorities....	135
On occupational diseases.....	55, 70
On program for conference.....	86, 102, 108
On proposed sewerage for Coshocton.....	117
On proposed county sewer for Toledo.....	117
On resolutions in re retirement of C. O. Probst.....	86, 92
On rules governing the state plumbing inspector.....	31
On rules adopted by health officer of Lowellville.....	129
On securing quarters outside State House.....	100
On typhoid fever at New Concord.....	39
On water supply for Lakeside.....	45, 122
Report of, on conference on lake pollution.....	92
To investigate conditions at St. Bernard and Carthage.....	35
To investigate use of chlorine in public water supply at Cleveland.....	104
Communicable Diseases —	
Admission of persons to state institutions.....	52
Acute poliomyelitis	149, 157, 430, 458, 475
Diphtheria	135, 141, 149, 155, 428, 430, 453, 454, 455
Scarlet fever.....	111, 113, 116, 119, 126, 149, 156, 428, 455, 473, 476
Smallpox.....	113, 115, 116, 118, 119, 122, 125, 126, 129, 130, 135, 140, 148, 154, 429, 430, 460, 474
Typhoid fever.....	116, 124, 135, 141, 142, 149, 157, 428, 434, 438, 443, 447, 449, 452, 461, 462
Reports of cases of trachoma.....	33
Conferences —	
With local boards of health.....	9, 36, 135
Conference of State and Provincial Boards of Health —	
Appointing delegates to.....	36
Contagious and Infectious Diseases (<i>See Communicable Diseases</i>).....	6
Copland Heights (Toledo) —	
Sewerage for	32
Coshocton —	
Sewerage for.....	30, 38, 41, 117, 276
Water supply of.....	128, 136
County Hospital for Tuberculosis —	
For Defiance County.....	46, 51, 120
For Lorain County.....	53, 113, 115, 117, 120
County Institutions —	
Inspection of	492
Courtland, Trumbull County —	
Pellagra at	127
Covington —	
Sewerage for	27, 112, 282
Crawford County —	
Tuberculosis hospital, site for.....	127
Courtland —	
Pellagra at	127
Cowles Creek —	
Pollution of, at Geneva.....	32, 42, 114-115, 136, 368

	PAGE
Cridersville —	
Diphtheria at	141
Croton —	
Sewerage for	106, 285
Custar, Wood County —	
Scarlet fever at.....	111
Cuyahoga Falls —	
Sewerage for	81, 106, 286
Typhoid fever at.....	141
D.	
Darke and Miami Counties —	
Plans for tuberculosis hospital for.....	113
Suit against trustees of, tuberculosis hospital.....	127
Dayton —	
Water supply of.....	78, 109
Defiance —	
Sewerage for	15, 18, 288
Smallpox at	460
Water supply of.....	31, 44, 115
Defiance County —	
Hospital for tuberculosis.....	46, 51, 120
Delaware —	
Sewage purification for.....	29, 146, 291
Smallpox at	116
Delphos —	
Pollution of Jennings Creek by.....	45, 69, 122, 352
Delphos Manufacturing Company —	
Copperas recovery plant for.....	352
Pollution of Jennings Creek by wastes from.....	122
Derby, Pickaway County —	
Smallpox at	130
Deshler —	
Investigation of nuisance at.....	138
Diphtheria —	
At Belle Valley.....	155
At Bridgeport	156
At Cridersville	141
Examination of specimens.....	481, 482
At Jerry City.....	454
At Marietta	149
At Portsmouth	455
At Roseville	453
At Tuscarawas County Children's Home.....	430
District Hospital for Tuberculosis —	
For Miami and Darke Counties.....	45
District Tuberculosis Hospital —	
Plans for, near Akron.....	93, 113
Dittoe, W. H.—	
Appointment as chief engineer.....	7, 90
E.	
East Liverpool —	
Water supply for.....	25, 27, 115, 357

	PAGE
East Palestine —	
Approval of rules adopted by health officer.....	61
Eaton —	
Sewage purification at.....	160
East Palestine —	
Water supply for.....	121
Election of Officers —	
Of State Board of Health.....	54
Elkton —	
Investigation of nuisance at.....	152
Elmore —	
Water supply at.....	151
Elyria —	
Sewerage of	31
Sewage purification at.....	120
Emerald Township, Paulding County —	
Complaint against German-American Sugar Company.....	84
Engineering Committee —	
Reports of.....15, 26, 36, 42, 55, 64, 74, 80, 90, 95,	105
Engineering Department —	
Information blank for use.....23,	46
Terms of appointment of chief engineer.....	39
Work of	6
Epidemiologist —	
Report of	428
Euclid Beach Park —	
Sewerage for	159
Evansport —	
Smallpox	155
Executive Committee —	
Reports of.....14, 25, 36, 48, 54, 64, 77, 88, 100, 104,	108
Expense Accounts —	
To be itemized.....90,	153
Exhibits —	
For International Congress on Hygiene and Demography.....	71
F.	
Fayette —	
Approval of rules of health officer.....	33
Finance Committee —	
Reports of.....14, 25, 36, 42, 48, 54, 64, 77, 80, 88, 95, 102,	105
Folger (Jacob) Packing House —	
Complaint against for polluting stream.....	22
Fort Recovery —	
Sewerage for	30, 117
Water supply of.....	128
Fostoria —	
Conference in re sewage purification for.....	121
Conference in re water supply for.....	121
Water supply at.....	151
Fredericksburg —	
Water supply of.....55,	179
Fulton County, German Township —	
Smallpox in	113

G.		PAGE
Galion —		
Sewage purification for.....	15, 17, 129,	145
Water supply at.....		144
Gallipolis —		
Water supply of.....		144
General report		5
Geneva —		
Pollution of Cowles Creek at.....	32, 42, 114, 115, 136,	368
Georgesville —		
Scarlet fever at.....		473
German-American Sugar Company —		
Complaint against, for polluting stream.....	84, 136,	143
Gettysburg —		
Scarlet fever at.....		113
Smallpox at		119
Gibsonburg —		
Sewerage for	57,	296
Girls' Industrial Home —		
Complaint against sewage from.....		118
Scarlet fever at.....		126
Typhoid fever at.....		126
Glendale —		
Typhoid fever at.....		443
Granville —		
Scarlet fever at.....		156
Great Lakes, The —		
Investigation of pollution of.....		154
Green Camp —		
Complaint against sewage from Marion.....		142
Greenspring —		
Scarlet fever at.....		119
Inspection of ice supply at.....		157
Greene County Children's Home —		
Sewerage and sewage purification for.....	42, 160,	294
Greene County Infirmary —		
Sewage purification at.....		160
Greenville —		
Complaint against sewage from.....		124
Greenwich —		
Scarlet fever at.....		476
Groeniger, Wm. C.—		
Appointed as State Inspector of Plumbing.....		8
Groveport —		
Investigation of nuisance at.....		139
H.		
Harveysburg —		
Scarlet fever at.....		157
Health Officers —		
Approval of.....	23, 32, 39, 40, 46, 52, 60, 70, 84, 94, 101, 104,	122
City and village.....		518
Hilliards —		
Sewerage for	75, 148,	297

Hiram —	PAGE
Water supply for.....	75, 140, 181
Hudson —	
Sewage purification at.....	118
Hypochlorites —	
Use of in water purification.....	60

I.

Infantile Paralysis (<i>See Acute Poliomyelitis</i>)	
Infectious Diseases (<i>See Communicable Diseases</i>)	
Inspections —	
County institutions	492
Investigation —	
Of summer resorts.....	105
Inspections —	
Miscellaneous plumbing systems.....	510
State institutions	493
State and municipal.....	512
International Congress on Hygiene and Demography —	
Exhibits for	71
International Reform Bureau —	
Request for literature on venereal diseases.....	23
Inventory —	
Of property of State Board of Health.....	86
Ironton —	
Water supply of.....	12, 16, 19, 84, 87, 88, 114, 128

J.

Jefferson —	
Sewage purification at.....	138
Water supply for.....	63, 68, 137
Jennings Creek —	
Pollution of, at Delphos.....	45, 69, 122, 352
Jerry City —	
Diphtheria at	454

K.

Kenmore —	
Sewage purification for.....	145
Kennedy Heights —	
Sewage purification for.....	55, 121, 300
Kensington Addition (Columbus) —	
Sewerage and sewage disposal for.....	97, 274

L.

Laboratories —	
Changes in staff of.....	480
Summary of examinations.....	481
Work of, in 1911.....	8, 480
Lake Pollution —	
Conference of health officials on.....	84, 92
Lakeside —	
Sewerage for	13, 49
Water purification for.....	12, 13, 44, 45, 49, 59, 64, 130, 183
Lakewood —	
Sewage purification at.....	49

	PAGE
Lebanon —	
Complaint against, for polluting stream.....	93, 105, 143, 150
Leesville —	
Rules adopted by health officer.....	71, 140
Legislation —	
Amendment proposed to Bense Act.....	39
Bill opposing vaccination.....	33
Lewisburg —	
Investigation of nuisance at.....	140
Water supply at.....	137
Leroux Cider and Vinegar Company —	
Complaint against, for polluting stream.....	22
Letter of transmittal.....	3
Licenses —	
For maternity boarding houses.....	32, 40, 46, 52, 70, 85, 94, 101
Lima —	
Complaint against, for pollution of Ottawa River.....	84, 99, 136, 378
Tuberculosis hospital near.....	113
Water supply of.....	20, 24, 25, 41, 95, 98, 114, 128, 143, 370
Linden Heights —	
Sewerage for	15, 18, 302
Lisbon —	
Water supply for.....	66, 117, 186
Little Miami River —	
Pollution of, by N. & W. Railway Co.....	22, 30
Livery —	
Automobile service	48
Livingston Seed Company —	
Complaint against	146
Lodi —	
Water supply for.....	28, 79, 98, 188
Longworth, Solomon R. —	
Removal of body of.....	101
Lorain —	
Water purification	64, 198
Lorain County —	
County hospital for tuberculosis.....	53, 113, 115, 117, 120
Loveland —	
Water supply for.....	30
Lowellville —	
Approval of rules adopted by health officer.....	53, 61, 129
Water supply for.....	26, 115, 200
Lucas County —	
Sewerage and sewage purification for District No. 1, 32, 39, 73, 107, 117,	303
M.	
McConnelsville —	
Smallpox at	154
Madison Home —	
Sewage purification at.....	138
Madisonville —	
Water supply of.....	131
Magnolia —	
Water supply for.....	158

	PAGE
Malaria —	
Examination of specimens.....	483
Malta —	
Water supply at.....	132
Malvern —	
Water supply for.....	81, 202
Marble Cliff —	
Sewage purification for.....	15, 17, 138
Marietta —	
Diphtheria at	149
Marion —	
Complaint against sewage from.....	142
Smallpox at	119, 125, 135
Water supply at.....	137, 159
Marysville —	
Complaint against sewage of.....	114
Sewerage of	20
Maternity Boarding Houses —	
Licenses for	32, 40, 46, 52, 70, 85, 94, 101
Medical Inspector —	
Per diem of.....	23
Medicines —	
Indiscriminate distribution of samples of patent.....	23
Meetings —	
Of State Board of Health.....	9
Meetings of Board (1911) —	
January 25th	12
March 2nd	24
March 18th	35
April 20th	41
May 9th	48
June 1st	54
July 19th	62
August 10th	72
September 14th	79
October 18th	87
November 21st	95
December 20th	104
Members —	
Of State Board of Health.....	4, 5
Mendon —	
Scarlet fever at.....	111
Mentor Knitting Mills Company —	
Complaint against	133
Miami and Erie Canal —	
Resolution in re abandonment of.....	35, 37
Use of water to improve Mill Creek.....	24
Miamisburg —	
Sewerage for	67, 140, 307
Water supply at.....	144
Middlenort —	
Water supply at.....	151
Mill Creek —	
Improvement of, by water from canal.....	24, 150

INDEX.

	PAGE
Millersburg —	
Water supply for.....	27, 205
Mills Creek (Sandusky) —	
Pollution of	52
Minster —	
Water supply for.....	77, 207
Minutes —	
Of Board meetings.....	11
Approval of	14, 25, 40, 42, 48, 64, 78, 80, 88, 95, 103, 104
Miscellaneous Inspections —	
Of plumbing systems.....	510
Miscellaneous Specimens —	
Examination of	484
Monroeville —	
Water supply at.....	137
Monthly Bulletin	5
Application to post office at Washington in re.....	112
Montpelier —	
Smallpox at	113
Morgan Run —	
Pollution of, at Cleveland.....	51, 59
Mt. Sterling —	
Water supply at.....	151
Murray City —	
Smallpox at	125
Water supply of.....	144
Muskingum County Children's Home —	
Sewerage for	77, 79, 92, 308
N.	
Navarre —	
Water supply at.....	158
Nelsonville —	
Water supply at.....	152
Newark —	
Typhoid fever at.....	438
Water supply for.....	25, 29, 121, 143
New Athens —	
Typhoid fever at.....	449
New Bremen —	
Sewerage and sewage purification for.....	44, 57, 310
New Concord —	
Approval of health officer.....	39, 122
Typhoid fever at.....	34, 39, 116
New Lexington —	
Smallpox at	125
Water supply for.....	109, 130
New London —	
Scarlet fever at.....	113
Water supply for.....	67, 209
New Philadelphia —	
Sewerage and sewage purification for.....	16, 19, 30, 312
Niles —	
Water purification for.....	28, 36, 50, 211

	PAGE
Norfolk & Western R. R. Co.—	
Pollution of Little Miami River at Claire.....	22, 30, 45
Smallpox among employees of.....	119, 122
North Amherst—	
Approval of filtering material for.....	133
North Star—	
Smallpox at	119
Norwood—	
Smallpox at	154
Nottingham—	
Sewage purification for Beachland.....	91, 255
Nuisances—	
At St. Bernard and Carthage.....	35
Complaint of, at Beachland.....	84
Complaint against Bryan Fertilizer Factory.....	60, 82, 127
Complaint against Livingston Seed Company.....	146
Complaint against Van Camp Packing Company.....	60, 83, 128
Complaint of, in Washington Township, Lucas County.....	22
Complaint against The C. O. Wells Co.....	133
Investigation of, at Bradley.....	124
Investigation of, at Buckeye Lake.....	140
Investigation of, at Cleveland.....	146
Investigation of, at Deshler.....	138
Investigation of, at Elkton.....	152
Investigation of, at Groveport.....	139
Investigation of, at Lewisburg.....	140
Investigation of, from Mentor Knitting Mills Company.....	133
Investigation of, at Oakwood.....	146
Investigation of, at Port Clinton.....	161
Investigation of, at Richwood.....	139
Investigation of, at Rye Beach.....	139
Investigation of, at Wadsworth.....	124
Investigation of, in Ward Township, Hocking County.....	134
O.	
Oak Harbor—	
Sewerage for	106
Water supply for.....	63, 64, 72, 74, 90, 214
Oakwood—	
Investigation of nuisance at.....	146
Occupational Diseases—	
Committee on	55, 70
Ohio River Sanitary Commission—	
Report to the Governor.....	8
O. S. & S. O. Home—	
Sewage purification at.....	124, 145
Ohio State Building Code Commission—	
Organization of	489, 490
Ohio State Sanatorium—	
Sewage purification at.....	419
Water supply at.....	414
Ohio State University—	
Experiments and tests of plumbing devices.....	88, 150

Order of Business —	PAGE
Adoption of	12
Orrville —	
Sewage purification at.....	120, 145
Ottawa River —	
Complaint against pollution of, by Lima.....	84
Oxford —	
Sewage purification at.....	112
Water supply for.....	58, 218
P.	
Payne —	
Water supply for.....	80, 87, 88, 222
Pellagra —	
At Courtland, Trumbull County.....	127
Per Diem —	
Of medical inspectors.....	23
Perry and Washington Townships, Franklin County —	
Scarlet fever in.....	116
Piqua —	
Sewerage for	43, 120, 322
Smallpox at	135
Pleasant Grove (Youngstown) —	
Sewage purification for.....	63
Pleasant Hill —	
Sewerage for	96, 316
Pleasant Ridge —	
Sewerage and sewage purification for.....	75, 148, 318
Pleasant Township, Marion County —	
Smallpox in	155, 474
Plumbing Inspection —	
Act governing	115, 486
Appointment of inspector.....	19
By state inspector of plumbing.....	61
Plumbing Inspector —	
Conference at Cleveland in re Warrensville.....	142
Experiments and tests at Ohio State University.....	88, 109
Plumbing Inspection —	
Recommendations in re State Building Code.....	54, 63
Report of Special Committee on.....	72, 84
Report on	8, 85, 91, 102, 135, 136, 158, 486
Plymouth —	
Water Supply of	22, 34, 48, 53, 380
Portage —	
Typhoid fever at.....	434
Port Clinton —	
Investigation of nuisance at	161
Water purification for.....	15, 17, 123, 130, 152, 224
Portsmouth —	
Diphtheria at	455
Scarlet fever at	455
Water supply for	63, 78, 130, 225
Post Office Department, Washington —	
Monthly Bulletin	112

Pratt, R. Winthrop —	PAGE
Resignation of	7, 90
Probst, C. O. —	
Resignation of	5, 78
Resolution in re resignation of.....	92
Put-in-Bay —	
Sewerage for	108, 148, 323

R.

Rabies —	
Examination of specimens	482
Railroad Sanitation —	
Request for conference on	108
Rassell (N) Sons Co. —	
Complaint against for polluting stream.....	22
Reading —	
Sewerage for	43, 325
Reports —	
Of Secretary	111
Residential sewage disposal —	
Plans for	102, 109
Resignation —	
Of C. O. Probst.....	78
Resolutions —	
Abandonment of Miami and Erie Canal.....	35, 37
Resolution —	
In re engineering advice.....	108
Resolutions —	
On resignation of Dr. Probst.....	93
Richwood —	
Investigation of nuisance at.....	139
Rickards, B. R. —	
Communication from	23
Rockford —	
Water supply of	132
Roseville —	
Diphtheria at	453
Ruedy (Albert) Packing House —	
Complaint against for polluting stream.....	22
Rules and Regulations —	
Approval of	33
Approval of for Archbold.....	110
Approval of for East Palestine.....	61
Approval of, for Leesville.....	71
Approval of, for Lowellville.....	53, 61
Rye Beach —	
Investigation of nuisance at.....	139

S.

St. Bernard —	
Complaint of nuisance at.....	35
Water supply of.....	118

Salem —		
Complaint against sewage of.....	21,	114
Sewage purification for.....	41, 56,	328
Sewerage of		21
Salem Township, Auglaize County —		
Complaint against pollution of St. Mary's River.....		128
Sandusky —		
Sewerage for	65, 106, 330,	332
Water purification for.....	59,	229
Water supply of.....	52, 106,	151
Scarlet Fever —		
At Georgesville		473
At Gettysburg, Darke County.....		113
At Girls' Industrial Home.....		126
At Granville		156
At Greenspring		119
At Greenwich		476
At Harveysburg		157
At Mendon		111
At New London		113
Perry and Washington Townships, Franklin County.....		116
At Portsmouth		455
Scioto River —		
Pollution of	51, 60, 70, 118, 127, 142,	384
Sebring —		
Sewage purification at.....		128
Secretary —		
Resignation of C. O. Probst.....	5,	78
Secretary's Minutes		11
Secretary's Office —		
Inventory of property.....		86
Secretary's Reports —		
January		111
March	113,	115
April		118
May		122
June		125
July		129
September		135
October		140
November		148
December		154
Secretary Reports —		
Approval of.....	31, 45, 70, 84, 92, 95, 103,	108
Sewage and Trade Wastes —		
Examination of		435
Sewage Disposal —		
For residences		102
Sewage Purification —		
For Akron		22
At Alliance		145
At Amherst	133,	160
For Andover	107,	253

Sewage Purification—Concluded—

	PAGE
For Ashland	130
For Ashtabula County court house, Jefferson.....	138
For Beachland	91, 255
For Bellefontaine	133, 137
At Bowling Green.....	144
For Bryan	27, 112, 256
For Bucyrus	29, 260
At Camp Perry.....	152
For Camp Wise (Euclid).....	45, 49, 129, 264
For Canton	91, 271
For Chardon	28, 272
For Cleveland Boys Farm at Hudson.....	80, 298
For Delaware	29, 146, 291
At Eaton	160
At Elyria	120
For Fostoria	121
For Galion	15, 17, 129, 145
For Greene County Children's Home.....	42, 160, 294
At Greene County Infirmary.....	160
At Hudson	118
For Idora Park, Youngstown.....	120
At Jefferson	138
For Kenmore	145
For Kennedy Heights.....	55, 121, 300
For Kensington Addition (Columbus).....	97, 274
At Lakewood	49
For Lucas County, District No. 1.....	107, 303
At Madison Home.....	138
For Marble Cliff.....	15, 17, 138
At Mt. Gilead.....	123
For New Bremen.....	44, 57, 310
For New Philadelphia.....	30
For North Amherst.....	133
At O. S. & S. O. Home.....	124, 145
At Ohio State Sanatorium.....	419
At Orrville	120, 145
At Oxford	112
For Pleasant Grove (Youngstown).....	63
For Pleasant Ridge.....	75, 318
For Salem	46, 56, 328
At Sebring	128
For Shreve	65, 154, 336
For Warrensville (Cleveland Infirmary).....	133
For Washington C. H.....	68, 340
At Westerville	138
At Wilberforce University.....	118, 160
At Willoughby-on-the-Lake	160
For Wilmington	95, 346
For Woodcrest, Youngstown.....	129
At Xenia	45, 50, 70, 123
Plans acted upon.....	7

Sewerage —	PAGE.
Of Ada	13, 41, 42, 72, 82, 87, 88, 114, 250
For Batavia	86, 91, 234
Of Bowling Green.....	144
For Bucyrus	29, 260
For Camp Wise (Euclid).....	45, 49
For Canal Fulton.....	80, 267
For Canton	81, 103, 108, 269
For Chardon	28, 272
Of Cleveland	95, 159
For Collins Sub-Division (Toledo).....	97, 338
For Copland Heights near Toledo.....	32
Of Coshocton	30, 38, 41, 117, 276
For Covington	27, 112, 282
For Croton	106, 285
For Cuyahoga Falls.....	81, 106, 286
For Defiance	15, 18, 288
Of Elyria	31
For Euclid Beach Park, Cleveland.....	159
For Fort Recovery.....	30, 117
For Gibsonburg	57, 296
For Greene County Children's Home.....	42, 160, 294
For Hilliards	75, 148, 297
For Kensington Addition (Columbus).....	97, 274
For Lakeside	13, 49
Of Lima	99, 378
For Linden Heights.....	15, 18, 302
For Lucas County, District No. 1.....	39, 73, 107-117, 303
Of Marysville	20
For Miamisburg	67, 140, 307
For Muskingum County Children's Home.....	77, 79, 92, 308
For New Bremen.....	44, 57, 310
For New Philadelphia.....	16, 19, 30, 312
For Oak Harbor.....	106
For Piqua	43, 120, 322
For Pleasant Hill.....	96, 316
For Pleasant Ridge.....	75, 148, 318
For Put-in-Bay	108, 148, 323
For Reading	43, 325
Of Salem	21
For Sandusky	65, 106, 330, 332
For Shreve	65, 336
For Swan Creek Lumber and Supply Company, Toledo.....	70
Of Urbana	51
For Washington C. H.....	56, 68, 340
For West Lafayette.....	67, 81, 345
For Wilmington	95
For Woodcrest, Youngstown.....	129
Plans acted upon.....	7
Resolution in regard to engineering advice.....	108
Shawnee Township, Allen County —	
Complaint against city of Lima.....	84
Shreve —	
Sewerage and sewage purification for.....	65, 154, 336

	PAGE
Sibley Creek —	
Complaint of pollution of.....	49, 72
Silver Lake —	
Request for information in re typhoid traceable to.....	141
Smallpox —	
At Bono	155
At Delaware	116
At Dayton	113
At Defiance	460
At Derby, Pickaway County.....	130
At Evansport	155
At Gettysburg	119
At McConnelsville	154
At Marion	119, 125, 135
At Montpelier	113
At Murray City.....	125
At New Lexington.....	125
Norfolk & Western R. R., among employees of.....	119, 122
At North Star.....	119
At Norwood	154
At Piqua	135
In Pleasant Township, Marion County.....	155, 474
At Westerville	125
At Yankeetown, Brown County.....	130
Removal of body, dead of.....	101
Springfield —	
Typhoid fever at.....	149, 462
Stafford —	
Typhoid fever at.....	452
State Board of Health —	
Election of officers.....	54
Meetings of	9
Members of	4, 5
State Building Code —	
Experiments and tests of plumbing devices.....	88, 109
Recommendations for changes in plumbing regulations.....	54, 63, 72
Report of special committee on plumbing.....	84
Printing of	150
State Inspector of Plumbing (<i>See Plumbing Inspection</i>).	
Appointment of	19
Opinion of Attorney General in re jurisdiction of.....	129
Reports of.....	71, 74, 85, 91, 102, 486
Rules governing	31
State Institutions —	
Inspection of.....	493, 498, 499
State and Municipal Inspections —	
of Plumbing	512
State Normal School —	
Site proposed for.....	144
Stowe Township —	
Typhoid fever in.....	142
Struthers —	
Water supply of.....	131-132

	PAGE
Sugar Creek —	
Water supply for.....	68, 230
Summer Resorts —	
Investigation of	105
Swan Creek Lumber and Supply Co. (Toledo)—	
Sewerage for	70
T.	
Ten Mile Creek —	
Complaint of pollution of.....	22, 49, 72, 93, 122
Toledo —	
Complaint against for polluting stream.....	22, 122
Investigation of trachoma in.....	39
Sewerage for E. T. Collins sub-division.....	97, 338
Water filtration plant for.....	24, 233
Trachoma —	
Investigation of. in Toledo.....	39
Reports of cases of.....	33
Transmittal, Letter of.....	3
Troy —	
Smallpox at	113
Tuberculosis —	
Examination of specimens.....	482
Sputum containers for.....	61
Tuberculosis Hospital —	
Conference in re site for Jefferson County.....	115
Investigation of proposed hospital for Butler County.....	112
County hospital for Defiance County.....	46, 51, 120
District hospital near Lima.....	113
Hospital for Lorain County.....	53, 113, 115, 117, 120
Hospital for Miami and Darke Counties.....	45, 113, 127
Plans for district hospital near Akron.....	93, 113
Investigation of site for hospital for Crawford County.....	127
Turtle Creek Township, Warren County —	
Complaint against village of Lebanon.....	93, 105
Tuscarawas County Children's Home —	
Diphtheria at	430
Typhoid Fever —	
At Cleveland	141
At Cuyahoga Falls.....	141
Examinations of	482
At Girls' Industrial Home.....	126
At Glendale	443
Information, request for in re.....	141
At Newark	438
At New Athens.....	449
At New Concord.....	34, 39, 116
At Portage	434
At Springfield	149, 462
At Stafford	452
In Stowe Township.....	142
At Willoughby	447
At Xenia	461

U.

University of Illinois —	PAGE
Plumbing tests at.....	150
Urbana —	
Sewerage of	51
Utica —	
Water supply for.....	31, 68, 234

V.

Vaccination —	
Legislation against	33
Van Camp Packing Company —	
Complaint against wastes of.....	60, 83, 128
Venereal Diseases —	
Among school children.....	46
Distribution of pamphlet on.....	23
Wasserman test for syphilis.....	46
Vermilion —	
Water supply of.....	137
Vital Statistics Law —	
Decision of supreme court in re.....	134

W.

Wadsworth —	
Investigation of nuisance at.....	124
Ward Township, Hocking County —	
Investigation of nuisance in.....	134
Warrensville (Cleveland Infirmary) —	
Approval of filtering material for.....	133
Washington C. H. —	
Sewerage and sewage purification for.....	56, 68, 340
Washington Township, Lucas County —	
Complaints of nuisances in.....	22
Wasserman Test —	
For syphilis	46
Wastes Disposal —	
Report on.....	7, 71, 77, 92, 134, 153
Water —	
Analyses in laboratories.....	484
Plans acted upon.....	7
Water Purification —	
For Bellaire	56, 65, 172
At Camp Perry.....	152
For Lakeside.....	12, 13, 44, 45, 49, 59, 64, 130, 183
For Lima	24, 25, 43, 370
For Lorain	61, 198
For Niles	28, 36, 50, 211
For Port Clinton.....	15, 17, 123, 130, 152, 224
For Sandusky	59, 229
For Toledo	24, 233
For Waverly	16, 18, 121, 242
Plans acted upon.....	7
Use of hypochlorites in.....	60

Water Supply —	PAGE
For Albany	97, 158, 164
For Amherst	27, 166
For Andover	51, 168
For Apple Creek.....	31, 121
Of Ashland	111
Of Barberton	159
For Bremen.....	68, 72, 74, 82, 100, 110, 143, 145
For Cambridge.....	12, 13, 54, 58, 76
Of Canton	136
For Centerburg	117
Of Circleville	143
Of Columbus	70
For Coshocton	128, 136
Of Dayton	78, 109
Of Defiance	31, 44, 115
For East Liverpool.....	25, 27, 115, 357
For East Palestine.....	121
At Elmore	151
Of Fort Recovery.....	128
Of Fostoria	121, 151
Of Fredericksburg	55, 179
Of Galion	144
Of Gallipolis	144
For Hiram	75, 140, 181
Of Ironton	12, 16, 19, 84, 87, 88, 114, 128
For Jefferson	63, 68, 137
Of Lewisburg	137
Of Lima	20, 41, 95, 98, 128, 143
For Lisbon	66, 117, 186
For Lodi	28, 79, 98, 188
For Loveland	30
For Lowellville	26, 115, 200
Of Madisonville	131
For Magnolia	158
Of Malta	132
For Malvern	81, 202
Of Marion	137, 159
Of Miamisburg	144
At Middleport	151
For Millersburg	27, 205
For Minster	77, 207
At Monroeville	137
At Mt. Sterling.....	151
Of Murray City.....	144
At Navarre	158
At Nelsonville	152
For Newark	25, 29, 121, 143
For New Lexington	109, 130
For New London.....	67, 209
For Oak Harbor.....	63, 64, 72, 74, 90, 214
At Ohio State Sanatorium.....	414
For Oxford	58, 218
For Payne	80, 87, 88, 222

	PAGE
Water Supply—Concluded—	
Of Plymouth.....	22, 34, 48, 53, 380
For Portsmouth	63, 78, 130, 225
Of Rockford	132
Of St. Bernard.....	118
Of Sandusky	52, 106, 151
Of Struthers	131, 132
For Sugar Creek.....	68, 230
For Utica	31, 68, 234
At Vermilion	137
At Waverly	121
At West Manchester.....	137
Of Willoughby	111
For Wilmington.....	13, 62, 79, 81, 87, 88, 111, 131, 243
Of Youngstown	131
Of Zanesville	37, 408
Resolution in regard to engineering advice.....	108
Waverly —	
Water purification for.....	16, 18, 121, 242
Wauseon —	
Complaint against sewage of.....	60, 127, 128, 405
Complaint against Van Camp Packing Company.....	83
Wells Company, The, C. O.—	
Complaint against	133
Westerville —	
Smallpox at	125
Sewage purification at.....	138
West Lafayette —	
Sewerage for	67, 81, 345
West Manchester —	
Water supply at.....	137
Wilberforce University —	
Inspection of	502
Sewage purification at.....	118, 160
Willoughby-on-the-Lake —	
Sewage purification at.....	160
Willoughby —	
Typhoid fever at.....	447
Water supply of.....	111
Wills Creek —	
Pollution of, at Cambridge.....	45
Wilmington —	
Sewerage and sewage purification for.....	95, 346
Water supply of.....	13, 62, 79, 81, 87, 88, 111, 131, 243
Xenia —	
Sewage purification at.....	45, 50, 70, 123
Typhoid fever at.....	461
Yankeetown —	
Smallpox at	130
York Township, Fulton County —	
Complaint against Van Camp Packing Company and Wauseon.....	83, 128

Youngstown —	PAGE
Sewage purification for Idora Park.....	120
Sewerage and sewage purification for Woodcrest.....	129
Water supply of.....	131
Zanesville —	Z.
Water supply of.....	37, 122, 408
Zehner Bros. Packing Company —	
Complaint against, for polluting stream.....	23



